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Vol. LXXIII, No. 18 WASHINGTON, D. C., FEBRUARY 15, 1926 $3.00 a Year. 20 Cents a Copy

N. R. A. Directors Hold Annual Meeting

AMENDMENTS to the by-laws to facilitate the functioning of the association pending a complete revision of its constitution, authorization of the appointment of a committee to make such revision, election of officers and an enthusiastic discussion of plans for the promotion of small-bore shooting were the outstanding features of the annual meeting of the board of directors of the National Rifle Association, held in the Lafayette Hotel in Washington on Feb. 10.

Roll call revealed the following directors present: Maj. L. W. T. Waller, Capt. Karl D. Loos, Maj. Gen. F. C. Ainsworth, Capt. G. L. Wotkyns, Maj. C. H. Wilson, Maj. Julian Hatcher, James E. Murray, H. L. Day, Stuart Scott, Maj. Harry L. Smith, Capt. Wallace Darling, J. K. Jensen, Maj. Harold Wirgman, Maj. Basil Middleton, Maj. Francis W. Parker, Jr., Commander E. E. Wilson, Gustavus D. Pope, Commander W. A. Lee, Lt. Col. A. B. Critchfield, Lt. Col. L. M. Rumsey, Maj. Townsend Whelen, Lt. Col. C. C. Stanchfield, Karl T. Frederick, Maj. J. B. Van Sciver, Maj. Ralph Kayser, Brig. Gen. L. A. Toombs, Maj. H. H. Kerr, Brig. Gen. Clifford R. Foster, Lt. Col. Fred M. Waterbury, Col. A. J. Macnab, Russell Wiles, Capt. T. G. Samworth, Brig. Gen. M. A. Reckord, Brig. Gen. G. A. Fraser, Brig. Gen. Carlos E. Black, Lt. Col. C. C. Shaw, Col. George Kemp, Brig. Gen. Bird W. Spencer, Maj. K. K. V. Casey, Dr. M. E. McManes, Hon. Benedict Crowell, R. V. Reynolds.

The treasurer's report was read by Capt. Loos, treasurer for the last year. It revealed that the association had been placed on a sound financial footing and that a complete audit of its affairs had been made by certified public accountants. On this the following report was submitted by Col. A. J. Macnab, Jr., and R. V. Reynolds, a committee appointed to audit the books:

"In view of the fact that the books of the association have been carefully audited by a competent auditor and copies of the audit are available for distribution to all directors, your committee stands on the audit as rendered and approves it."

The report of the treasurer as well as that of the auditor was accepted and approved.

The report of the acting secretary, of which copies had been distributed in advance of the meeting, was accepted and approved without being read at the meeting.

The resignation of E. C. Crossman as a director was accepted and the vacancy thus created was filled by the election of Rear Admiral Montgomery Taylor.

OFFICERS OF THE N. R. A. FOR 1926-27

President—Senator Francis E. Warren.
First Vice-President—Lt. Col. F. M. Waterbury, New York.
Second Vice-President—Hon. Benedict Crowell, Ohio.
Third Vice-President—Lt. Col. L. M. Rumsey, Missouri.
Executive Secretary—Brig. Gen. M. A. Reckord, Maryland.
Assistant Secretary—C. B. Lister, Washington, D. C.

Members of the Executive Committee

Maj. L. W. T. Waller, Pennsylvania.
Maj. Francis W. Parker, Illinois.
Maj. Gen. C. C. Williams, Chief of Ordnance, U. S. A., Washington, D. C.
Col. G. A. Fraser, North Dakota.
Capt. G. L. Wotkyns, U. S. A., Springfield, Mass.
G. D. Pope, Michigan.
Rear Admiral Montgomery Taylor, Chief of Fleet Training Section, Washington, D. C.
Lieut. Commander E. E. Wilson, U. S. Navy, Washington, D. C.
Col. A. J. Macnab, Jr., U. S. A., Washington, D. C.
Maj. Ralph Keyser, U. S. M. C., Washington, D. C.
Brig. Gen. M. A. Reckord, Maryland.

MAJ. PARKER, chairman of a committee consisting of himself, Commander Wilson, Capt. Wotkyns, Mr. Wiles and Mr. Pope, which had been appointed to revise the by-laws, reported that in the opinion of the committee only such changes should be made at the meeting as were absolutely necessary to the proper functioning of the association.

"Your committee feels," said Maj. Parker, "that the best way to correct any inadequacies in our by-laws is to revise them completely and urges that a permanent committee be appointed by the president, to obtain legal counsel and make proper revision. In the meantime the committee offers the following suggestions for changes necessary to the present welfare of the association:

"(1) The treasurer of the association should be the treasurer of one of Washington's great banks or trust companies. We can get the services of such a man for a nominal salary, and doubtless for nothing, if we elect him from the bank or trust company in which the bulk of our funds is kept. Our treasurer has virtually nothing to do beyond signing checks on vouchers approved by the president or acting president of the National Rifle Association. All of our treasurer's records are kept, and all of his statements prepared, by the bookkeeper and cashier of the National Rifle Association.

"This simple and feasible plan would give the National Rifle Association all the benefits of a proposed plan (that has been found to be unworkable) of making a bank or trust company our Treasurer. By-Laws should be amended accordingly.

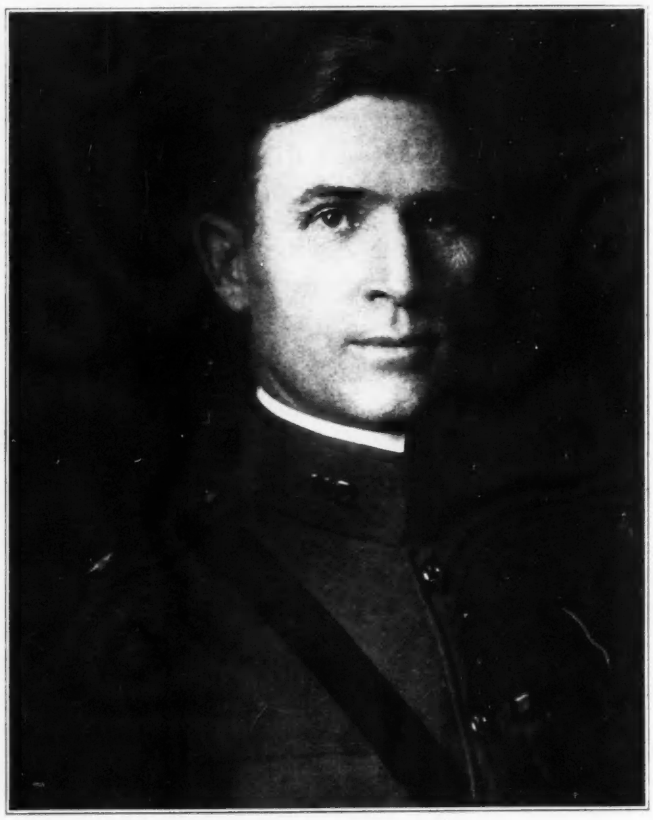
"(2) An Acting Treasurer and an Acting Secretary, duly empowered to act, should always be ready immediately to take the place of either the Treasurer or Secretary on his expected or unexpected absence or inability. Under our existing By-Laws, such prompt substitution can never be effected unless the Executive Committee happens to be in session at the time, and it is doubtful that the necessary power to act could lawfully be delegated by the Committee at any time under existing By-Laws. These By-Laws should be amended so as to authorize and require the Executive Committee to maintain constantly an Acting Treasurer and an Acting Secretary and specifically to empower them to perform the duties of Treasurer and Secretary during the absence or inability of these officers.

"(3) The Treasurer and Secretary should not be members of the Executive Committee, as such, because their votes and influence might easily be used to their own advantage and against the best interests of the Association. They can readily be called to attend a meeting of the Committee whenever information or advice shall be desired of them.

"Therefore, we propose these amendments to By-Laws.

"*Article 4, Section 4.* 'There shall be elected annually by and from the board of directors, a president, three vice-presidents, and eleven members of the executive committe, the board shall also elect a secretary and a treasurer, who may or may not be directors.'

"Executive committee, Section 1: 'There shall be an executive committee of fifteen members, consisting of the president, the three vice-presidents, and the eleven directors elected as hereinbefore provided.'



Brig. Gen. Milton A. Reckord, Executive Secretary of the National Rifle Association.

Gen. Reckord is a business man of Bel Air, Md., who has devoted much of his time to the service of his country. He will give up his grain and milling business and active management of his packing plant to serve as executive secretary of the National Rifle Association.

Gen. Reckord was born in Bel Air, Md., December 28, 1879. He entered the Maryland National Guard as a private, in its reorganization after the Spanish-American War and was promoted by successive steps, so that at the time of the trouble on the Mexican border he had reached the grade of major. As major he went to the Mexican border with the 1st Maryland Infantry. When the regiment was mustered into the federal service at the outbreak of the World War, Gen. Reckord was taken with it as major and was promoted shortly thereafter to the grade of lieutenant colonel of the 115th Infantry and later was promoted to the grade of colonel and assigned to command the same regiment.

He took the regiment overseas and commanded it in action. He also commanded temporarily both the 57th and 58th Brigades while in the defense of the center sector Haute Alsace. He was awarded the Distinguished Service Medal and the Croix de Guerre with Palm.

Upon his return from France he was made adjutant general of Maryland, a position which he still holds. He was a member of the general staff committee which prepared the present plan of the Army, the National Guard and the Reserve Corps after the war. He also is a member of the general staff eligible list and for the last two years was president of the National Guard Association.

"Duties of officers, Section 8, last sentence: 'The executive committee shall designate and empower suitable persons to act respectively as secretary and treasurer during the absence or inability of those officers.'"

The request for the amendment of the By-Laws was signed by the following directors:

Maj. Parker, Mr. Wiles, Capt. Wotkyns, Capt. Darling, Col. Stanchfield, Dr. McManes, Gen. Fraser, Maj. Hatcher, Commander Lee, Gen. Reckord, Commander Wilson, Mr. Day, Maj. Casey, Maj. Wilson and Mr. Pope.

The motion for the adoption of the amendments was passed unanimously as was the motion to appoint a committee on revision.

After some discussion as to various plans for changing the charter of the association the meeting decided to await the report of the committee before attempting action.

ON motion of Col. Macnab a nominating committee was appointed and the meeting proceeded to the election of officers. Gen. Ainsworth, who as first vice-president presided in the absence of the president, appointed the following nominating committee:

Maj. Hatcher, Maj. Parker, Commander Wilson, Mr. Pope, Lt. Col. Rumsey, Maj. Sciver, Maj. Keyser, Col. Macnab and Dr. McManes. The committee retired and after a conference of some fifteen minutes returned and reported a list of nominations. Maj. Hatcher as chairman explained that the committee had omitted to offer a name for the office of secretary, feeling that there was some uncertainty as to the views of the directors on the type of secretary desired. He added that a number of names well worthy of careful consideration had been mentioned and said it was the feeling of the nominating committee that the question of the secretary should be settled in open discussion on the floor by the directors. The recommendations of the

(Continued on page 6)

National Board Lets Down Bars

By Robert Derr

YOU can use your pet rifle now to qualify in record practice under Army Regulation 850, provided the gun shoots a .30 cartridge and has iron sights. The National Board for the Promotion of Rifle Practice, at its annual meeting on Tuesday, February 9, in the office of Assistant Secretary of War J. Hanaford McNider, voted to change the old regulation requiring qualification with the service rifle as issued to permit civilian shooters to shoot the course and earn the qualification badges with their pet dolled up rifles—provided the weapons had iron sights and carried the .30 calibre cartridge.

This was the outstanding feature of the meeting at which some other minor changes in rules were made, the medal allowance for the national rifle and pistol team matches increased, and a warning issued that an appropriation for the promotion of rifle practice soon would be needed if shooting is to continue under its present impetus.

The warning as to the need for funds came from Lieut. Col. George C. Shaw, director of civilian marksmanship, in the course of the reading of his annual report. Col. Shaw reported that his department had made 15,000 sales, totalling approximately $180,000. Col. Shaw explained that the free issue reserve would be exhausted soon and that if the practice of issuing supplies to clubs was to be continued in 1928 an appropriation of approximately $240,000 would be necessary.

He reviewed in detail the work of his department for the last year and pointed out that the interest of civilians in rifle shooting was growing rapidly. In commenting on the last National Matches at Camp Perry he let it be known that a substantial reduction in expense had been made by the executive officer of the 1925 matches and intimated the belief that these matches were now on a rock bottom basis.

Following the approval of the report of the D. C. M. the board took up the question of revising the national match rules. The first change decided upon was the restoration of the third or rapid-fire stage of the national rifle team match to its 1924 status. This means that the rapid-fire stage of this match will be shot at target "A" at 300 yards instead of in target "B" at 400 yards, as was done in the 1924 matches.

The second stage of the same match was changed also to require ten shots prone from standing instead of sitting or kneeling from standing. This returns the second stage of the match to the conditions required in 1924.

The board then revised the rule which has permitted competitors to have their score cards signed and turned in at their convenience so as to require collection and verification of scores immediately after each competitor completes his string.

Section "F" of paragraph 3, in bulletin 7, which specifies the organizations and institutions qualified to enter teams in the National Rifle Team match was changed from "The National Guard (including the Naval Militia) and the state troops of the several states and territories, including the District of Columbia, 1 from each" to read:

"The federally recognized National Guard of the several states and territories, including the District of Columbia, 1 from each."

This change was brought about when a member of the board requested to be informed of the status of the state troops which under the old regulation were presumed to exist outside of the National Guard. The change removes all reference to troops of states other than the guard.

Article "G" of the same paragraph was amended to limit the Organized Reserves to such teams in excess of one as might be designated by the War Department.

Similar changes were made in articles "F" and "G" of paragraph 21, which specifies the qualifications for entry into the National Pistol Team match. In the pistol match as in the rifle match reference to unclassified state troops is eliminated and the federally recognized National Guard specified. The Organized Reserves are placed under the same restriction as in the National Rifle Team match.

Article "L" of paragraph 21, governing entries into the national pistol team match was amended to provide for a wider representation of police teams.

It was changed from "The organized police force of any city in the United States . . ." to read "any regularly organized police force. . . ."

This will enable state constabulary units and railroad or bank patrols to enter teams, a right which was questionable under the old regulation.

The increase in medal allotment came after a discussion of the present system of allocating a certain number of medals to the regular service, National Guard training reserve units and civilian competitive groups in the national rifle and pistol team events.

It was declared by a number of the board members that although the matches purported to be national championship events, under the grouping system a first prize—and so-called championship winner—in one group might have a lower score than a competitor in a lower skilled group who failed to get any prize.

It finally was decided to provide in the rifle match 15 gold medals, 25 silver medals and 100 bronze medals and in the pistol match 12 gold medals, 24 silver medals and 36 bronze medals to be awarded to competitors in the order of standing regardless of unit affiliations. The executive committee was authorized to arrange for prizes to be allocated to each group for competition within its own membership on the basis of scores shot in the national team events.

Col. Shaw announced that at the request of the War Department members of the Reserve Officers Training Corps and the Citizens Military Training Corps, members of these units would in future receive their qualification insignia from the headquarters of their respective corps areas. He also stated that he had been unofficially informed that the

(Continued on page 6)

N. R. A. Policy for 1926

By Brig. Gen. M. A. Reckord, Executive Secretary N. R. A.

In accepting the position of executive secretary of the National Rifle Association, I feel that I have both shouldered a heavy responsibility and accepted a great opportunity. To my mind the executive officer of the Association is, in a large measure, responsible for the promotion of rifle shooting among the civilian population, and this promotion is vital to the security of the nation. It must be carried on in such fashion that the opportunity to shoot will be available to every person who desires it, and the responsibility for making this opportunity offers a great opportunity for service to the shooters of the nation.

Sites which can be utilized for long range work with the service rifle are, because of the increasing value of land, limited almost entirely to property owned or controlled by the national government or the several states, so that the use of high-power rifles is necessarily restricted to state or federal ranges. However, experience has shown that training with the small-bore weapon amply qualifies individuals to use the service arm effectively and ranges capable of handling small-bore shooting are available in every community.

Therefore, it is my hope that within a few years we shall have small-bore and pistol ranges as common as baseball fields in this country, that high-power ranges will be within at least ten miles of every shooting organization and that rifle shooting, of every variety, will be restored to its place as a great national sport. To this end I intend to direct my energies and for it I ask the support of every shooter in the nation.

Budget Boss Hears National Match Pleas

By Wilbur Cooper

FRIENDS of national defense and devotees of rifle shooting ploughed through the trail of a blizzard the morning of Wednesday, February 10, to appeal to Director of the Budget Lord for approval of an appropriation that would make possible the holding of the National Matches at Camp Perry in 1926.

A snow storm had stolen upon Washington in the night and its people awakened to find the city blanketed by a foot of snow. Traffic was badly snarled, few automobiles were moving and these with difficulty, street-cars were behind schedule—but the proponents of adequate rifle training for the civilian population as well as for the various arms of the military service arrived at the office of the director of the budget promptly at the time set—10 a. m.

Virtually every arm of the service was represented—the Navy, the Marine Corps, the Army and the National Guard. Besides this there was a large delegation of civilians. The crowd taxed the capacity of the hearing room. But it was representative of the nation. Civilians from the East, the Far West, the Middle West, the South and the North were there. And all made the same plea: "Don't undo the work that has been done in training riflemen for national defense by taking away the impetus of the national matches."

The defense of the National Matches was led by Col. A. J. Macnab, jr., who was in charge of training all the American troops in France in rifle shooting, and whose system of training is now in general use by the military forces.

Col. Macnab called as his first "witness" Maj. Gen. Robert H. Allen, chief of infantry, U. S. A., who made an eloquent plea for the national matches as an incentive to rifle training.

"Those who have never attended the National Matches, or who have never given serious thought to what they accomplish from a national standpoint, look on this activity primarily as a big annual sporting event that costs a considerable sum of money," Gus Allen said.

"This viewpoint is erroneous. The National Matches are, in reality, our National School of Musketry and as such occupy a place of vital importance in our scheme of National Defense.

"In the early period of our history we were first a colony and later a nation of expert marksmen, and our success in every war in which we were engaged was due, primarily, to this national characteristic and the offensive spirit that it engendered in our citizen soldiery. And in this latter, insofar as modern warfare is concerned, lies the crux of the matter. The man who knows his weapon, who has confidence in its excellence and in his ability to use it, is imbued with a feeling of superiority over his opponent that makes him the aggressor. What is true of the individual is equally true of the group of individuals.

"The Infantry that knows its superiority with the rifle is offensive Infantry and seeks maneuver warfare in which this same feeling of superiority furnishes the incentive to close with the enemy. The Infantry that lacks this superiority with the rifle, and knows it, lacks confidence and loses its aggressiveness—it becomes defensive Infantry seeking the protection of trenches. An Infantry superior with the rifle uses the rifle; an Infantry inferior with the rifle uses the shovel. As a nation of marksmen, our outstanding national characteristic in battle was the offensive spirit.

"It is therefore a vital national necessity to foster rifle marksmanship and keep our nation in the lead as a nation of marksmen. Rifle shots are made, not born—marksmanship is not hereditary. Under existing conditions in this country, we must interest and instruct our citizenry in rifle marksmanship, and the National Matches furnish both the interest and the instruction. The Matches furnish the sporting element that creates interest and draws the crowd; the school of musketry conducted there, which is the big thing, furnishes the instruction.

"Discontinue the National Matches and the School of Musketry conducted there and a vital blow has been struck, not only at national preparedness, but at our great national military asset should we ever again become involved in war—our offensive spirit.

"It is my own personal belief that the National Matches take equal precedence with any other activity conducted during the period of summer training as a vital part of our scheme of National Defense."

General Allen added that he believed the National Matches well worth all they cost not only because of the training they gave those who attended them, but because of the fact that every man who attended the national matches brought many new recruits into the shooting game.

The budget officer then asked Col. Macnab if it was not a fact that certain unusual qualifications were necessary for those who sought to be outstanding marksmen.

Col. Macnab—No. All that is needed is proper training.

The Budget Officer—Then why have we been taught to believe that such is necessary?

Col. Macnab—Because for a good many years this shooting game was regarded as a sort of an occult art. It was surrounded by mystery and bunk.

The Budget Officer—I presume, then, that you can teach any man with a keen eye and a steady nerve to shoot.

Col. Macnab—A keen eye and a steady nerve has nothing to do with it. What is needed is proper training. A man's instinctive method of shooting is wrong. He must be taught the correct method. That is a matter of training pure and simple. Unless a man is a complete idiot he can be trained to become a fair shot. If he's even a half idiot we still can make a shot of him, but we must teach him now. Shooting is purely a mechanical operation and a person can be taught to do it as they are taught to drive an automobile. For example—there are half a million half-idiots in this country driving Fords. They were taught how. Yet if a man hasn't been shown the trick of driving one of the things you might have a million of them in front of the building here and he couldn't turn a wheel on any of them.

The Budget Officer—But, Col. Macnab, we are not proposing to abandon the National Matches. We merely plan as a measure of economy to hold them every other year. Isn't that all right?

Col. Macnab—Here's the answer to that. You all noticed the snow this morning. You notice that a few automobiles managed to plough through it—they were all right while they kept going. The moment they stopped they were all through. It was one big job to get started again. If we lose the momentum which the National Matches give us we will have a hard job getting going again.

Frank J. Kahrs, of Remington Arms, called attention to the fact that improvements in ammunition and rifles were the direct result of the National Matches.

"The present splendid ammunition," Mr. Kahrs said, "and the present fine Springfield rifle are the direct result of the experiences of the country's most expert shots at the National Matches. If it were not for the matches these developments would not have taken place."

Col. George M. Kemp of the Pennsylvania National Guard and Col. Fred M. Waterbury of the New York National Guard pointed out to the budget officer that the civilian and guard marksmen were directly responsible for making shots out of the regular troops and that the cooperation that brought this about was fostered by the national matches.

Brig. Gen. M. A. Reckord, Maryland National Guard, pointed out to the budget officer that only by maintaining a shooting population in the country could the nation be ready for a national emergency.

Gen. Reckord recalled the World War, when men utterly unskilled in the use of firearms were sent forward as replacements to combat troops.

"When I was a colonel in France," Gen. Reckord told them, "I received about a thousand men as I was leading my regiment up to the firing line. I discovered that hardly one of them had any experience at all in the use of the service rifle—or any other rifle,

(Continued on page 8)

Safeties on Firearms

By Will J. Hays

SAFETIES are really an interesting subject when one considers that they date from only about 1700, and first appeared on the flintlock type of firearms—never to the writer's knowledge on a wheel-lock. Safeties were used by the early firearm manufacturers principally to safeguard the priming powder in the flash-pan, and used mostly on the carriage and pocket pistols, for the thought of using a safety for the protection of the user was, I dare say, a secondary thought to the makers and was not such an important item as it is today. Firearm makers, especially revolver or automatic pistol manufacturers of this day, dwell on the perfection of their various safety devices, stating in words of their advertisements that their revolvers or automatics are absolutely safe against accidental discharge and one can even "hammer the hammer" of a certain type revolver without endangering himself or an innocent bystander.

The safeties on the modern military arms are still a point of study, and the design of such a mechanism will always be an important part of a rifle, shotgun, revolver, or automatic-pistol, for the guard against premature discharge is really not perfected by any means, and the present forms are still too slow in manipulation for the military and police type of firearms. Accidental death is an every day item of news and it always will be until a firearm is equipped with a device which will be absolutely safe both from a standpoint of a guard against accidental discharge and for quickness of use combined in a mechanism which will not be too fragil or too large.

One of the first type of safeties was the use of the "sliding bar" safety, and this type, in various forms was used by all makers of high grade pistols such as duelling, officers' military, and pocket flintlock pistols; although up to 1780 the use of a safety on a military flintlock pistol was uncommon and very seldom if ever used on a musket.

The principle of design of the early types was the use of a thum-bar slide fixed on the outside of the lock-plate at the rear of the hammer. It was worked by the thumb pushing a bar into a notch cut in the tumbler, thus locking the hammer at half cock. Inside the lock-plate a slide worked by the thumb lug inserted a pin into a hole in the lower part of the frizzem which held the battery down on the pan, safeguarding the priming powder in the flashpan from being spilled out in case the battery was accidentally caught or struck and forced open.

Another type was used on "box-lock" pocket and carriage pistols. The design was a slide which pressed against the rear of the hammer holding it at half cock. This form was made of a single piece of iron fitted over the hammer. The principle of the thumb lug was used and the forward part of the slide was used to push a pin into a hole in the frizzen similar to the first design. This safety was held down by a lug which passed through the top of the frame and was fastened down by a pin, and a forked spring was usually used to press down against this pin in order to insure a tight fit of the safety to the top of the frame.

For reasons of the set or hair triggers used on duelling pistols safeties are usually found on all of the better class of pistols and on even some of the commoner ones. The "Code" was so worded that if a pistol of one of the principals was accidentally discharged while in his hands it could not be reloaded unless his opponent permitted it. It was also a custom for witnesses to load and prime both pistols before reaching the duelling ground and before permitting the principals to select their weapons; accordingly, a safety to protect against discharge was imperative.

Accidental discharge of firearms was quite frequent in the early firearm age, especially in the armies. If one studies the early warfares of the period prior to the Revolution and during the time of the Revolution he will read of many accidental discharge of firearms among members of scouting parties, etc., which usually disclosed the position of these parties. Still, government weapons were not equipped with safeties, and the principle reason for this was on account of the unreliability and crudeness of the best designs known at that time.

Another type used was the trigger-guard safety which locked the hammer at half cock when the guard was pushed back toward the grip. In order to release the safety the guard was then pushed forward and the movement was entirely operated by the trigger finger. It was especially fast to release when set, for the back of the trigger finger was used to push the guard forward thus keeping the finger in a firing position the entire time. This was the speediest of safeties used on flintlock or percussion pistols but was also the most unreliable for most any slight blow or pressure would release this safety. Robert Wheeler (Birmingham, 1770-1789) and T. A. Rea (London, 1780-1812), and many other noted makers used this type on many of their pistols.

The only military or naval flint or percussion-lock pistol to be equipped by the United States Government with a safety was the contract pistol of 1819 which our Government gave Simon North and other private contractors. This was the "slid-bar" type with the thumb lug placed back of the hammer on the lock-plate and was to hold the pistol at half cock. It was found too unsafe and the use of a safety on pistols fell out of use.

The French army tried out the "hook" safety as illustrated in Fig. 1, but they were never authorized for military use for the hook was apt to be released when thrust into a holster or belt, and again both hands were needed to operate this design for the hook was held secure by the pressure of the hammer spring and the hammer need to be drawn slightly back in order that the safety be released.

The "slide-bar" safety worked by the thumb was succeeded by the introduction of the "detent" system at the beginning of the percussion era. The principal of this detent was a lever which, controlled by the rise of the hammer, intercepted the downward fall of the hammer until released by the trigger, with the principle of design to act as a guard against the slipping of the hammer while it was being cocked.

Some of the early percussion revolvers, especially the Colt, used the pin type safety. Between the capped nipples on the rear of the cylinder a small pin was inserted with about one-thirty-second of an inch protruding. When the revolver was to be "put on safety" the cylinder was revolved by hand until one of these pins was rotated in line with the hammer which was then lowered and a small hole in the hammer directly below the striking face caught the pin and held the cylinder with the nipples to the side of the hammer. This was quite safe if the hammer was not struck or jarred back releasing the pin and rotating the cylinder.

We have now reached the modern cartridge revolver period, but as most every one of us are familiar with the various forms of hammer-lock and grip squeeze safeties there need be no discourse on the late type designs. Accordingly, the writer will close this article with a description of a German government military percussion pistol. This pistol was made at the German government armory at Suhl and is the 1852 model. It is equipped with a safety which although slow is the safest used throughout the flint or percussion era and one might even include the present firearm period.

The writer has practically all forms of safeties used on pistols in his collection of pistols and has tried them all out in his study of their various designs, but discounting the slowness of action this German safety is by far the best for it will stand any test and will still protect the pistol from discharge. The writer has even "hammered the hammer" with the hammer in its down position as shown in Fig. 2 and was unable to fire the pistol. Fig 3 shows the hammer cocked in position for firing with the safety back and the capper nipple exposed.

The safety, as shown in the illustrations, is fastened on the lock by a screw which threads into a hole with a position identical as the screw used to hold the battery on a flintlock pistol. The lower portion of the safety is formed into a stem which acts on a spring which is the size and shape of a flintlock battery spring and the mechanism works on the principle of the flint battery except that

it is operated by the hand. When the pistol is loaded and capped the hammer is half cocked and the safety lowered. The forward end of the safety cups over the cap and when the hammer is lowered to set on top of the safety there is a clearance of nearly one-sixteenth of an inch between the striking face of the hammer and the top of the cap, and as there is no metal directly on the cap or sufficiently near the top of the cap accidental discharge is impossible. It took both hands to operate this safety and for reasons of its slowness it was never a welcomed addition to military pistols.

There has never been an absolute guard against accidental discharge which contains all the requisites of military or civilian demand, but there are possibilities of a firearm safety being made and it is absolutely needed, and when it is found it will be another trench gained against those who would like to have a law passed against the private manufacturing and use of pistols.

National Board Lets Down Bars

(Continued from page 3)

International Matches would be held in Parma, Italy, in September, 1926, adding that no official confirmation was available.

Mr. McNider informed the board that he would be glad to have the members nominate its own executive committee. Col. Shaw pointed out that an attempt had been made to do this at a previous meeting, but that the action was disapproved by the then Secretary of War, who held, Col. Shaw said, that the selection of the executive committee was entirely in the hands of the assistant secretary, subject to the approval of the chief of the department.

Mr. McNider declared, however, that he would prefer to have the board submit a list of the members it desired appointed so that he might submit it to the Secretary of War with the recommendation that they be named. This was done, but the Secretary of War's appointment has not yet been announced.

In issuing his warning that the supplies with which the D. C. M. has been keeping clubs entitled to government issue going are nearly exhausted, Col. Shaw pointed out that for the last several years the requirements of such clubs have been met by drawing on stocks left over from the war and turned over to his office by the ordnance department.

"These supplies have been drawn out," he told the board, "but while there has been constant drain there has been no replacement and we are reaching the point where the matter will have to be handled by an appropriation. The present stocks will be completely exhausted by 1928.

"Something should be done because we are likely to lose the value of the increasing interest which has been aroused in rifle shooting if something is not done."

Mr. McNider thanked the board members for their interest and sacrifices in order to assist in the promotion of rifle shooting and promised to give them every assistance in his power.

A Little Deal in Guns

By Louis V. Manning

LIFE holds two regrets. My first is that my father's name is not Rockefeller, or Ford, or some other such $olid, ubtancial name, easily recognized by the purr of the motor. The second regret is like unto the first, for my other choice would make me a MacDougal, or MacTavish, or MacPherson—anything but a MecHanic—as it is only a Highlander that can do profitable business with a Holylander.

Jack Greenlaw wanted a rifle. At the Bazaar of the Golden Spheres, the salve voice of Isreal floated across a show-case of solid gold f. vatches, chenuvine chip-tiamondts, und unredeemt pletches:

"Vell, vot can ve do for you dis morningk?"

"Wha't the' price o' yon r-r-rifle?" burred the quiet Scot.

"To you, mine friendt, it vos ten tolalrs. Take a look at it."

"Ae dinna want tae look at it: Ae canna afford ten dollars."

Jack started for the door, but the salve voice came again from the region of the Spanish Colts:

"Ve vill make you a very spetsial price off sefen-fifty."

"Ae canna gi' more than four-r-r."

"Four tollars! Vere couldt you get such a fine rifle like dot for four dollars, tell me dot?"

"Is there nae more Jews doon the street?"

"Take it for zix tollars."

"Le' me look tae it."

Isreal transferred the arm to Jack:

"A Mar-r-rlin. Ae dinna think much o' th' Marlin, lad."

"Dot gun iss yours for fife: I gif you my vord, ve lose money on it."

"Le' me see yon wipin'rod." The scowling Scot threw open the action and examined the rifle's entrails: the scowl deepened. He thrust the rod through the bore, looked down the muzzle, then handed back the rod and gun:

"Put it back on th' shelf, lad: Ae'll be goin'."

Jack again started for the door, but from the region of the antique modern arms, the salve voice halted him a second time:

"Mister, vot vas de matter mid dis gun?"

"Ye know your business, lad: Ae'll no' tell ye."

The puzzled Isreal held the breech to the light:

"I can't see noddings wrong."

"Ae'm nae occulist, lad."

"Vell, take it for four tollars."

"Nae, lad: Ae willna gi' four dollars."

"Do you want it for two und a halluf?"

"Nae, lad: Ae canna say as Ae want it for a gift, e'en."

"Vell, vot vill you offer for it, den?"

"One dollar: an' Ae mus' be goin'."

Sadly Isreal wrapped up the Marlin and rang up the dollar. But as the unruffled Scot essayed the door for the third time, the salve voice again halted him:

"Mine friendt, chust man to man, vot iss de matter mit dot gun?"

And from the doorway Jack's quiet voice answered:

"Weel, lad, an ye put it that way, mon tae mon, Ae'll tell ye: not a domned thing."

N. R. A. Directors Hold Meeting

(Continued from page 2)

nominating committee were accepted unanimously and the secretary was instructed to cast one ballot for the officers named.

Gen. Ainsworth, who had been renominated for his position of first vice-president, explained that the press of his personal business would make it impossible for him to continue in an active position in the association, and although urged by the directors to continue, declined to accept re-election.

AFTER a discussion in which nearly every director present took part, Gen. Reckord was placed in nomination for the post of executive secretary by Gen. Black. The nomination was seconded by Gen. Fraser.

Lt. Col. Joseph M. Coward was nominated by Gen. Spencer.

Capt. Samworth nominated C. B. Lister. The nomination was seconded by Mr. Pope.

No further nominations being made, the meeting proceeded to ballot.

Mr. Pope and Col. Macnab were appointed tellers. The count showed the following vote:

Gen. Reckord	22
Mr. Lister	19
Col. Coward	1

On motion the election of Gen. Reckord was declared unanimous.

Gen. Reckord briefly thanked the members and said in conclusion:

"I hope that the association will be just what was indicated by the last motion—a unanimous association—and I assure you it will be my earnest endeavor to do just the things you gentlemen want done and accomplish everything we desire for the organization."

Mr. Frederick moved that in view of the rapidly growing membership and influence of the organization the office of assistant secretary should be created by the directors. He also moved that Mr. Lister, who had been acting secretary of the association for many months, be elected to the office.

Gen. Reckord seconded both motions as did Col. Macnab.

Mr. Lister was elected by acclamation.

After discussion of routine matters the meeting adjourned.

The American Rifleman

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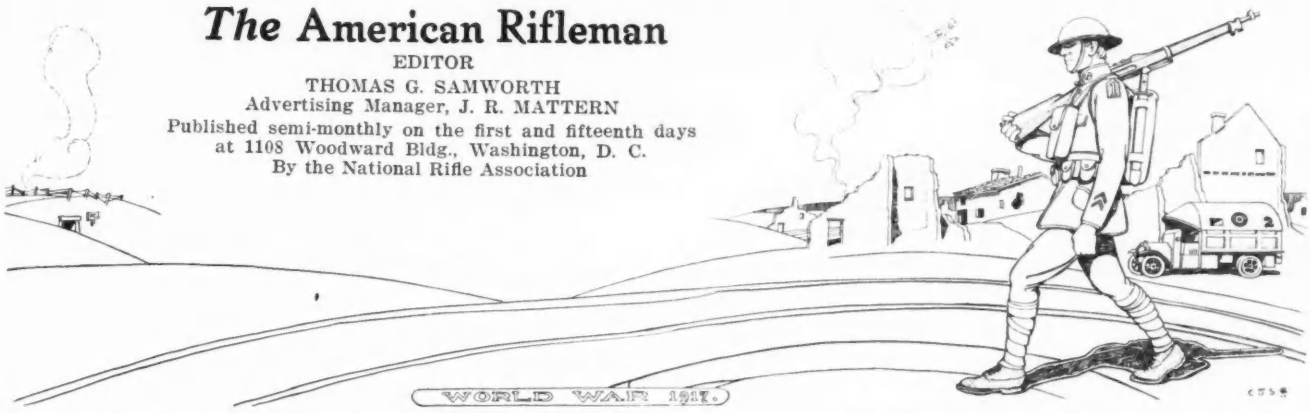

The World War. No longer a nation of riflemen. Many soldiers of the A. E. F. reached the front line without ever having fired a rifle. Many did not know how to load their weapons and, having emptied the loads placed in them by non-commissioned officers, were helpless, although carrying an ample supply of ammunition in their belts and baldoliers.

WITH the annual meeting of the directors of the National Rifle Association, a full account of which is given elsewhere in this issue of the AMERICAN RIFLEMAN, shooting in this country appears to have gained new hope and strong impetus. The roll call of the directors was answered by a group of men unselfishly devoted to the work of promoting shooting, which is a basic element of national defense, as a popular sport, so that America will become, once again, a nation of riflemen.

The civilian, the Army, the Navy, the National Guard and the Marine Corps were about evenly represented. Each group was moved solely by the desire to place the organization in a position not only to serve those who already are interested in shooting, but to recruit constantly new shooters and organize clubs toward the end that every able-bodied American, boy or man, may become skilled in the use of some sort of firearm.

A Range in Every Town

It was significant, too, that there was no line of cleavage among the various groups. On questions on which opinion was not unanimous the directors voted as individuals and not as groups. Each man did his own thinking and voted in accordance with his personal views. So it was that Army men, Navy men, Marines, National Guardsmen, and civilians were recorded on one side of a question against Army men, Navy men, Marines, National Guardsmen and civilians on the other side. This situation prevailed in the election of the executive secretary as well as in all other deliberations. At no time was the unanimous vote of any one group recorded on any question, until the entire body agreed to declare a decision of a majority unanimous, as was done after the votes were counted for the election of officers. Brig. Gen. Milton A. Reckord was elected executive secretary, thereby becoming the active operating officer of the association. C. B. Lister, who has been acting secretary for a number of months, was elected assistant secretary.

In Gen. Reckord the N. R. A. has an executive officer who is a civilian with an understanding of the soldier's problems and a soldier with ability to see the viewpoint of the civilian.

As a civilian Gen. Reckord is a plain business man who has successfully operated a variety of enterprises. As a soldier he commanded troops in action in France and won the Distinguished Service Medal and the Croix de Guerre with Palm. He has a record of accomplishment in all he has undertaken and he has the confidence of all who know him. Those who do not may well accept as a guarantee the fact that his election as secretary was made unanimous after the votes showed him to have been elected.

Elsewhere in this issue appears Gen. Reckord's own statement of his policy. It is of a character to reassure every shooter in the country, be his favorite weapon the small-bore, the service arm, the pistol or the hunter's piece. It is this—"a small bore range in every town; a safe service rifle range within 10 miles of every club."

The N. R. A. has a leader—and a policy—that will make America, once again, a nation of riflemen.

* * *

IF, when the next great national emergency comes, America, made a nation of riflemen through the activities of the National Rifle Association, survives, it is to be hoped that a grateful republic will remember and honor a man who for years labored tirelessly to build for his country an impregnable parapet of rifles.

A Debt of the Nation

That man is Maj. Gen. F. C. Ainsworth, U. S. A., Rtd., who at the annual meeting of the directors declined re-election as first vice-president of the association, electing to place the burden of active administration of the association's affairs on the shoulders of younger men, while standing ready to give counsel and assistance should it be needed.

Always an enthusiast in shooting, and an expert marksman as well, Gen. Ainsworth began the work of encouraging rifle practice in the United States many years ago when he was the adjutant general of the army. Through his long years of service he continued that work to the end that when he retired from active service the country had a shooting army, small, but ef-

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fective. Retirement from military duties did not dim his enthusiasm and he continued to work for the training of riflemen through the National Rifle Association and through every agency which could be induced to train marksmen.

When a strong hand was needed to guide the association Gen. Ainsworth, at great personal sacrifice and without recompense or hope of reward, gave unstintingly of his time and energy to pilot the association through its difficulties. He did his work well. The association is stronger than at any time in its history. There are more riflemen being trained than ever before. For this the association may thank Gen. Ainsworth.

But it is not the National Rifle Association only that owes a debt to this distinguished soldier and patriot. It is the nation that his devotion has placed on the road to national safety which should, and some day will, give him the honor that is his due.

Budget Boss Hears Nat'l Match Pleas

(Concluded from page 4)

for that matter. I had to rig up an emergency range, using a railroad embankment for butts, and at least let them fire a few rounds to learn how the rifle functioned. But there was not time to give them any real training. I had to take them on to the front. Fortunately the armistice was signed before I put them in the front line. It is a vital necessity that everything that will teach the American people to shoot be done—we don't want any more helpless recruits flung into a combat unit in the stress of a national emergency. To teach them we should give them an incentive. It seems to me that the National Matches are the big incentive."

The Budget officer explained that it was not a question of opposition to the matches.

"It is a question of whether you get the money for the matches or whether we continue to build up an ammunition reserve and continue the C. M. T. C. and the R. O. T. C. Do you think the matches of more importance than the training units?"

Col. Macnab—I do. We can teach men drill in a short time. If they are skilled riflemen we can manage them with a minimum of drill. But we can't make riflemen over night. It is going to take years to build up a reservoir of riflemen on which we may draw in a national emergency. The matches re necessary to building that reserve.

The Budget Officer—But how about ammunition? Do you think it is better to have skilled riflemen with empty rifles and no ammunition than it is to have ammunition and few skilled riflemen?

Col. Macnab—Ammunition is a matter of machine production. If you have to have it you'll speed up and get it. But you can't turn out riflemen by machine. What good is ammunition if you have no men who can use it effectively?

Col. L. M. Rumsey, jr., of St. Louis, Mo., pointed out to the budget officer that any interruption in the annual matches would have a dampening effect on the enthusiasm of shooters. He explained further that every convert to rifle shooting made several more and that the national matches probably were returning more to the nation in national defense material than any other activity.

Maj. F. W. Parker, jr., Chicago, declared that the budget officer had overstated the situation in declaring that other defense activities would have to be abandoned if the matches were held.

"It is not a question of abandoning training activities," Maj. Parker declared. "It is not a question of ceasing to pile up an ammunition reserve. It is merely a question of taking from these activities a comparatively small amount so that these matches may be held and the interest of the shooters of the country kept alive.

"It seems to me that a little might be taken from each of the other activities in order to permit these matches. Certainly the holding of them only every other year will be a great blow to shooting. Imagine how much interest there would be in golf or baseball if these sports held championship events only once in two years. If the money cannot be obtained elsewhere it seems to me it well might be taken a little at a time from other activities."

Maj. K. K. Casey told the budget director that he believed he would find that the public would favor an allotment of funds for the national matches even in the face of the administration's economy program.

"Boiled down to facts," said Maj. Casey, "it is not what the budget director wants, nor what we want; it is what the people want. And I sincerely believe that the people, when they understand the facts, will want the National Matches."

With this the budget officer agreed. He gave no indication, however, of his intentions, and the meeting adjourned.

The Sixteen Gauge and Round Bullets

By Chas. Askins

I HAVE always been against shooting buckshot at deer. Half the time the beast is only crippled and the other half the shooter deserves little credit for good holding. Except for a desire to try my rifles on deer, I wouldn't shoot them at all. This thing of killing a fine animal like a deer, merely for the meat he carries is not to be commended except when no other meat is obtainable. However, some States have a fool law against using rifles; hence this experiment with a view to find a shotgun load which would permit the smooth bore to do the same work as the rifle.

I have tried the factory round-bullet loads, but could never get enough accuracy out of them to satisfy me. Frank Kahrs agreed to send me some round bullets if I wished to experiment with hand loading, and part of the result is shown on another page.

The factory round bullet is of course a pretty loose fit being nearer a twenty-gauge than a sixteen, for use in the latter bore. I meant to patch those bullets and did. The patches were made of the usual Canton flannel, the same as is used for rifle cleaning patches. I simply drew the shot charge, took the top shot wad and placed it on top of the base wads to fill up. On top of this came a fourth ounce of the fine shot that had been in the shell, and then the patched bullet was forced down on the wads and crimped in with the fingers. Patch was cut off to fit the same as when loading muzzle loading rifles. The fine shot beneath the bullet were intended partly as a cushion and partly to keep up pressure balances. A round bullet doesn't develop the same breech pressure as a load of fine shot.

The gun is an Ithaca sixteen with quarter choked barrels. The first thing that was done was to see that the patched bullet fitted snugly in the muzzle of the gun. I think that the load would shoot through either a full choked or a cylinder barrel all right but I had no full choked gun to try it in. I did try it in two other sixteen-gauge guns, one modified and the other cylinder. The modified choke shot very high, two feet high at a hundred yards, while the repeating shotgun scattered the missiles about over the target too much to suit me.

The old Ithaca, however, shot true to the sighting. All the bullets fired from it went in with a very even elevation. If I'd had sights on the gun it seems probable that I could have stayed in a four-inch ring at fifty yards. There seemed to be a tendency to get the eye off center at the rear when trying to get flat down on the rib, which is necessary if the missile is not to go too high. This accounts, I think, for shots 2 and 3, off center to the left. Three of those shots struck as close as though I had been shooting a rifle, any one of the five shots would have killed a deer in his tracks, if struck at all right.

There may have been some luck involved in making this diagram. However, the gun and the cartridge looked like bad medicine for a deer in the woods, not over sixty or seventy yards away. The first shot fired was at a spot on a locust tree, thirty yards away; that spot disappeared all the same as though a 505 had been fired at it. After the fifty-yard shooting I went to a hundred, firing three shots, of which one hit an eigth-inch bull, the other two would have landed in the man target.

I wouldn't hesitate to use this round bullet in preference to any buckshot load, and if a deer bounced up in the woods, to be gone in a couple of jumps, the shotgun would be quicker and just about as certain to make a hit as a rifle. As for power, granted the bullet weighed 400 grains and the velocity was 1500 feet, the energy would be about 2000 foot pounds. Of course I do not know exactly what the velocity was nor precisely what the bullet weighed. I am betting that a ten-bore bullet of this kind would make an elephant know he had been shot.

**Some Spark Photographs, Recoil and Pressure Curves of the 0.45 Caliber Colt Automatic Pistol

By Philip P. Quayle, U. S. Bureau of Standards

** Published by permission of the Director of the National Bureau of standards of the U. S. Department of Commerce.

THE 0.45 Caliber Colt Automatic, Model 1911, is a recoil operated pistol in which a portion of the energy of recoil is utilized to extract and eject the empty cartridge case, compress the recoil spring, and cock the hammer. During the remainder of the cycle the compressed recoil spring drives the slide forward, thus removing a fresh cartridge from the magazine and inserting it in the chamber of the barrel. The arm is then ready to fire again, and so to continue until the magazine is empty. The slide remains back after the last cartridge has been fired, thus warning the operator that the magazine is exhausted.

A brief and incomplete nomenclature is given below and refers to the pistol shown in Fig. I.

1. Barrel
2. Barrel Bushing
3. Slide
4. Front sight
5. Rear sight
6. Receiver
7. Hammer
8. Grip safety
9. Main spring housing
10. Trigger
11. Trigger guard
12. Magazine.

FIGURE 1

The spark photographs referred to in this article were obtained with a modification of the apparatus described in Bureau of Standards Scientific Paper No. 508 and elsewhere.‡

In this method the objects photographed are silhouetted upon a photographic plate or film by an electric spark of great intensity and such short duration that a bullet, though moving at great speed, appears almost perfectly sharp.

This apparatus has been developed to such a state that on some recent tests over eighty consecutive shot shells were fired without failing to record a single one.

The photographs as taken were about 5/4 natural size but they are considerably reduced in the present reproductions. The dimensions and distances mentioned in the following paragraphs are the values as they actually existed, without either magnification or reduction.

In Fig. 2 is shown the 0.45 caliber automatic pistol just after the cartridge has been fired. The gases of the propelling change which have leaked past the bullet may be seen just ahead of the muzzle.

It is of course, possible that a portion of these gases may be due to leakage past the bullet just after being unseated from the cartridge case and before entering the rifling to any great extent.

‡ See author's papers in Bibliography.

The sound wave shown at S had its origin at the muzzle and was started by the unseating of the bullet from the cartridge case. The slide has just begun to move to the rear as may be seen by its projecting portion just below the hammer spur.

Fig. 3. The first sound wave from the muzzle, which was shown at S in Fig. 2, has now passed off the firm and the blast wave from the release of the propelling gases has now attained an average radius, of approximately 2.6 inches. The bullet is 1.1 inches out of the muzzle and is still being accelerated. In fact the speed of the gases exceeds that of the bullet by an amount somewhat greater than the speed of sound in them, as evidenced by the sound wave of reverse slope seen just at the bullet's base. Some of these gases have blown through the blast wave in front of the muzzle. The slide has now recoiled nearly 1/8 of an inch.

Fig. 4. In this print there is no evidence of any further acceleration although the bullet is not quite 2.4 inches out from the muzzle. The blast wave has now attained a diameter of 9.4 inches. The slide has recoiled 0.15 of an inch. The first muzzle wave is seen at S.

Fig. 5. The blast wave is now approximately 13.6 inches in diameter. The bullet is 3.1 inches out from the muzzle and the slide, in the time interval elapsed between this and the previous print, has had no opportunity to move appreciably. The rearmost portion of the blast wave is seen just at the back of the trigger guard.

The first muzzle wave is seen at S and the wave A appears to be a sound wave which was started when the puff of smoke overtook and impinged upon the blast wave M.

Fig. 6. The bullet is now 4.4 inches out from the muzzle. The wave M has now passed on ahead of the gases and the wave A has attained a somewhat larger radius. The first muzzle wave is seen at S. The rearmost portion of the blast wave is seen just at the rear sight.

Fig 7. The various blast and muzzle waves have now passed off the film. The bullet is seen nearly 19 inches out from the muzzle. The slide has recoiled 0.3 of an inch.

Fig. 8. The slide has now moved back 0.35 of an inch. The bullet has just passed off the film. Note that there has not been the slightest evidence of gas leakage at the breech.

Fig. 9. The slide is now back 1.25 inches. The slight cloudiness just above the opening in the slide indicates that the empty cartridge case has been extracted and is about to be ejected.

Fig. 10. The slide has now reached its extreme rearmost position nearly 2 inches. (Actual maximum recoil of slide is 2 1/16 inches.) The empty cartridge case is just being ejected. The impact of the slide on the receiver now causes the muzzle to begin to tilt upward.

Fig. 11. The empty cartridge case is now almost clear of the slide and has nearly executed the first half-turn of its counterclockwise spinning motion. The muzzle is now tilted farther upward due to the impact of the slide on the receiver.

Fig. 12. The empty cartridge case has now cleared the slide and rotated through an angle of approximately 210°. The muzzle has a greater upward tilt and the slide is starting forward.

The Remington Auto Riot Cartridge

The slugs or pellets of the Remington riot cartridge designed for the 0.45 caliber Colt automatic pistol consist of three flat lead discs, one round lead ball and a hollow jacket as shown in Fig. 13.

In the cartridges observed and photographed the lead ball is so upset in firing that it becomes jammed in the case and forms an integral part of it thus increasing its mass without increasing its resistance. This accounts for the fact that the case does not immediately fall behind the heavy slugs as might have been expected but maintains the relative position in which it emerged from the muzzle. *Fig. 14—0.45 Cal. Remington Auto Riot Cartridge.*

This print shows the components just beginning to separate at a distance of 20 inches from the muzzle.

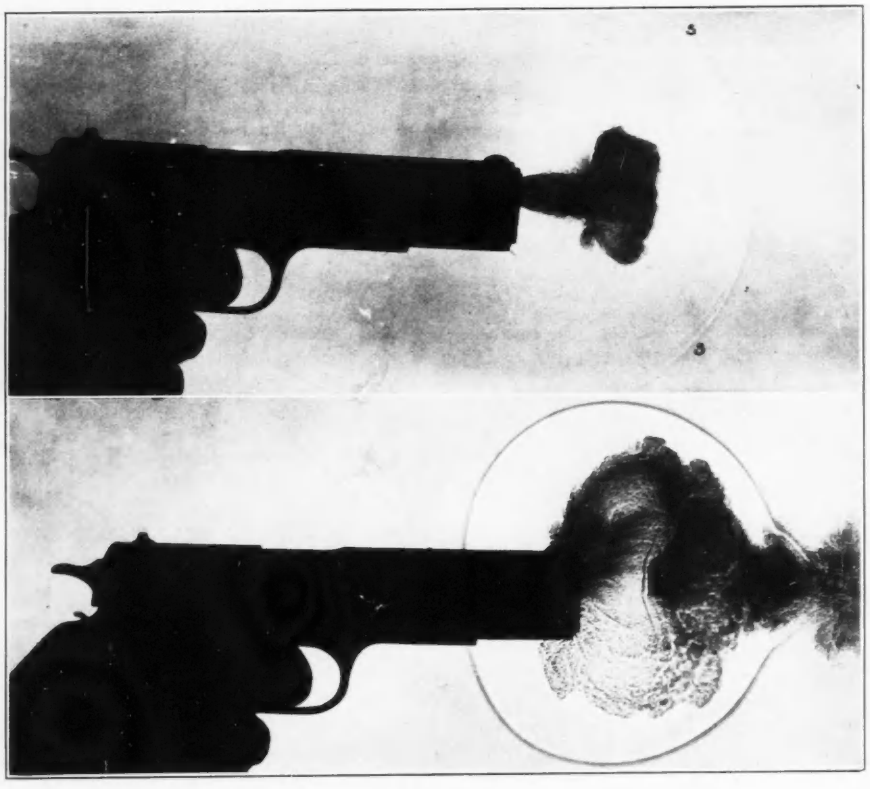

FIGURE 2. In Figure 2 is shown the 0.45 caliber automatic just after the cartridge has been fired. The dark mass of gas, seen just ahead of the muzzle, undoubtedly consists mostly of leakage gases, although the air which was in the barrel is also contained in it. The sound wave due to the unseating of the bullet from the cartridge case is shown at S. The bullet is of course still in the barrel. The original film clearly showed that the slide has already started back and this is confirmed by the recoil curve later in this paper. It should be clearly understood that as soon as the bullet moves appreciably, a proportional motion must also occur in the mechanism. The recoil takes place in accordance with the well-known laws of mechanics applicable in such cases, and only a very small portion of the acceleration of the slide is due to "the blast thrusting back on the air" as is sometimes stated.

FIGURE 3. In Figure 3 the bullet is out of the muzzle 1.1 inches, and since the gases of the blast are being deflected from its base, it is of course still being accelerated. Some of the gases of the blast are moving at such great speed that they have blown through the sound wave just in front of the bullet.

Fig. 15—0.45 Cal. Remington Auto Riot Cartridge.

This print shows the three base slugs separating at a distance of 3 feet from the muzzle. The first muzzle wave is shown at S, and the blast wave at M; the wave A has already been explained.

Fig. 16—0.45 Caliber Remington Auto Riot Cartridge ten feet from the muzzle.

The three base slugs are now well separated and the hol ow case with the ball inside it is still well ahead. The wave W is the blast wave after benig reflected from the floor.

Recoil and Pressure Curves

When the pistol is fired, the slide is suddenly driven back by the gas pressure and then gradually retarded by the springs and by friction, after the pressure has fallen. If the position of the slide during the recoil were accurately recorded in the form of a displacement-time curve, and if certain other elements of the problem were known, it would be possible to construct a pressure-time curve showing how the pressure rises and falls during the discharge. An attempt has been made to do this, and while no high accuracy can be claimed for the results, the method of obtaining them may be of interest.

The displacement or recoil curve is obtained photographically by sending a narrow horizontal beam of light, across but a little above the line of fire, through a vertical slot in a screen fixed to the slide, and letting it fall on a film which is moving vertically downward (see Fig. 17). When the slide is at rest, the spot of light traces a straight line along the film. During recoil, the spot is moved horizontally across the film and, because of the simultaneous motion of the film, a curve is traced from which the displacement of the slide at any instant can be determined, if a time scale is also marked on the film. Figure 17 shows the arrangement of apparatus and Fig. 18 shows one of the curves obtained with it.

In Fig. 17, A is the sheet iron screen, folded

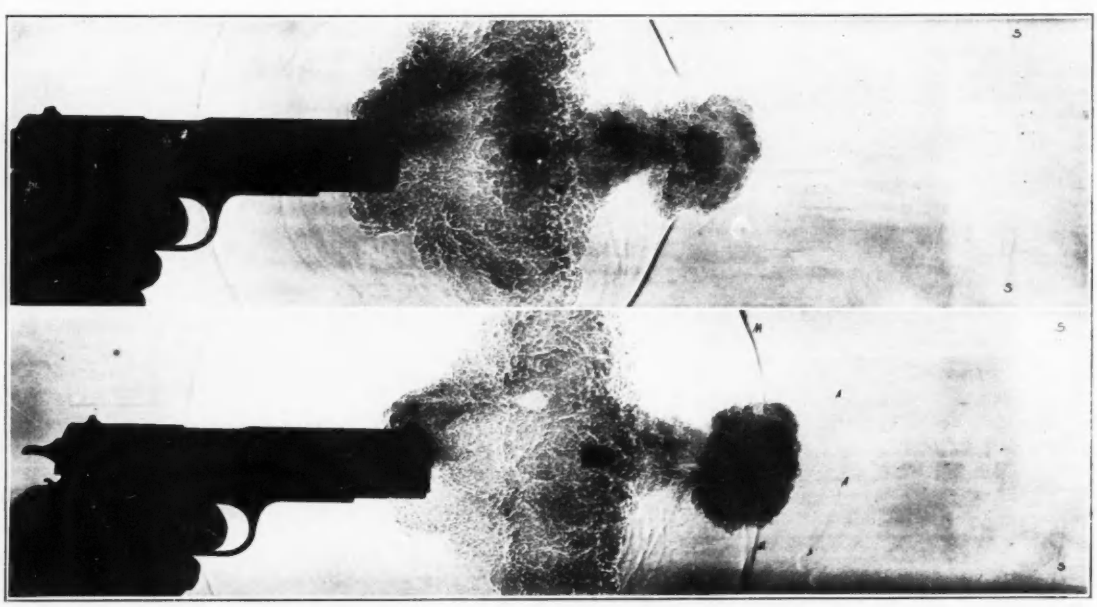

FIGURE 4. In Figure 4 we have no further evidence of any acceleration of the bullet, which is now out 2.4 inches from the muzzle. The slide has now recoiled 0.15 of an inch.

FIGURE 5. The bullet is now 3.1 inches out from the muzzle, the recoil of the slide is clearly seen. The first muzzle wave is seen at S and at A is seen a wave apparently started when the puff of smoke overtook and impinged upon the blast wave M.

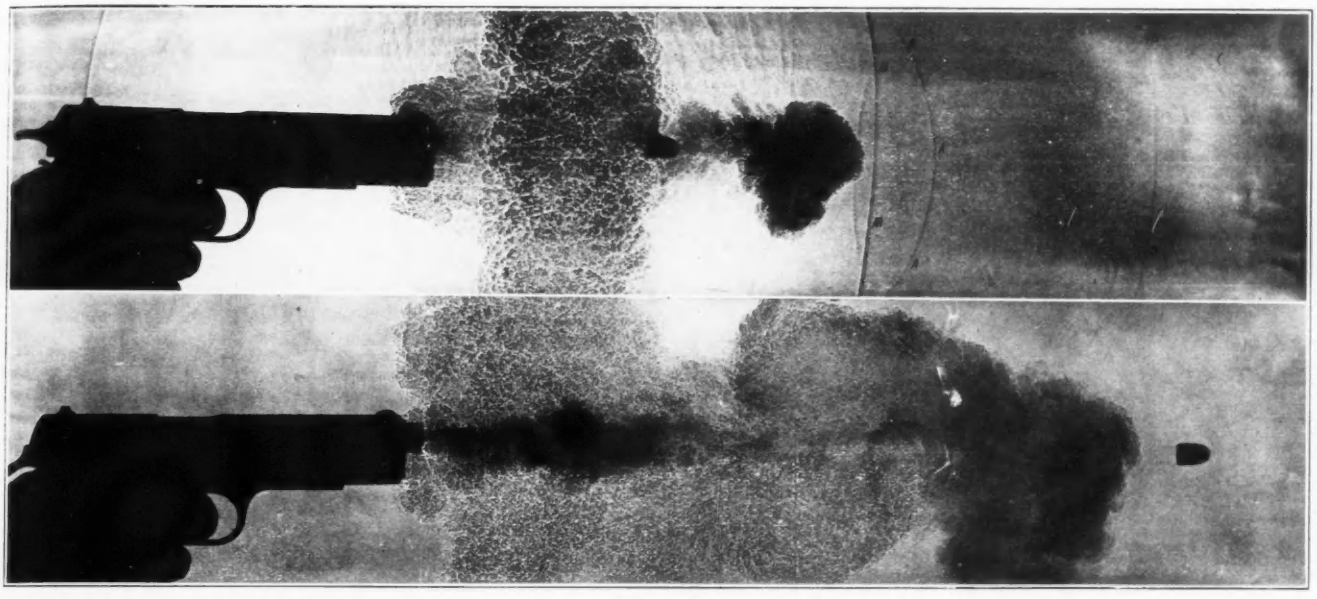

FIGURE 6. The bullet is now 4.4 inches out from the muzzle. The sound waves M and A have now passed on ahead of the dark mass of gas seen just behind them.

FIGURE 7. In this print the bullet is shown 19 inches out from the muzzle. The slide has recoiled 0.3 of an inch.

into a T section and fastened to one side of the slide, a slot in the horizontal leaf fitting over the front sight at B. S is the vertical slot which determines where the beam of light along FL shall strike the film F, and O is the "occulting bar," to be referred to presently.

The vertical leaf of the screen A must be long and wide enough to keep the light from the arc lamp, which illuminates the slot S, from falling on the film and fogging it. The horizontal leaf prevents the powder gases from obscuring the slot S as the bullet leaves the muzzle. This horizontal leaf also holds a small occulting bar O which is fastened with a bit of wax in a small slot just in front of the muzzle. This bar projects equally above and below the shelf and therefore has no turning moment acting on it when the slide is moved suddenly. The purpose of this bar is to produce a change in the illumination of the film at the instant the base of the bullet clears the muzzle. It accomplishes this by rotating about its center when the lower end is struck by the bullet, thus throwing the upper end backward and uncovering the lower half of the slot S which it formerly covered. The occulting bar is made of strip of thin sheet metal having great rigidity in the plane in which it rotates. It does not therefore bend or buckle when struck by the bullet but uncovers the lower half of the slot S immediately. The effect of this sudden change in the illumination is modified by the cylindrical lens of the camera but is nevertheless clearly shown at X in Fig. 18.

The required time scale is provided by sending flashes from a suitable oscillator and oscillograph through the upper part of the slot S and so producing a series of marks on the film, at one side of the recoil curve. These are the short vertical lines in Fig. 18; they are 0.001 second apart, the speed of the film being about 18 feet per second.

In Fig. 18 is shown one of two identical space-time curves obtained with the apparatus just described. The black line crossing the curve at X marks the point at which the base of the bullet cleared the muzzle and moved the occulting bar. This curve shows the remarkably short time in which the slide receives its acceleration. As soon as acceleration has ceased the slide continues backward at constant speed which is soon modified by the resisting forces into a curve which is concave downward as seen in the figure.

In Fig. 19 one of the recoil time curves is shown on an enlarged scale. By differentiating this curve mechanically we may obtain the velocity time curve shown just above the recoil curve, and from this we can determine the average value of the gas pressure during the first t seconds of the recoil.

Let v cm/sec = the velocity of the slide, t seconds after the instant of firing.

Let M grams = the combined mass of the slide, the screen attachment, and the other parts which move with them as a unit. We are interested only in the early stages of the recoil, before the bullet has left the muzzle, and during this very short time the barrel, barrel bushing, and plug move with the slide, so that their masses must be included in M. By adding the weights of the saparate pieces, it was found that their total mass was M = 578 grams distributed as follows:

Mass of slide	364 grams
Mass of barrel	87 grams
Mass of the slide attachment	108 grams
Mass of the barrel bushing and plug	19 grams
Total	578 grams

Let F dynes = the average force which has been acting on the mass M, during the t seconds since it started from rest, to give it the velocity v. Then Newton's second law of motion states that

$$Mv = Ft \text{ or } F = M\frac{v}{t} \qquad (1)$$

in which M is known and the value of v for any time t can be found from the velocity curve.

Let A cm^2 = the area of cross section of the bore, which was 1.03 cm^2; and let P dynes/cm^2 = the average gas pressure during the first t seconds. This gives an average backward force of PA dynes; but the motion is resisted by friction and by the springs, which are initially under compression, so that if we let Q dynes = the average value of this retarding force, we have for the average net backward force on the slide

$$F = PA - Q \qquad (2)$$

and by substitution in (1) we have

$$PA - Q = M\frac{v}{t} \qquad (3)$$

or

$$P = \frac{1}{A}\left(M\frac{v}{t} + Q\right) \qquad (4)$$

From the mean of a number of trials it was found that the force needed to just start the slide back against the springs and friction was 13.6 K gm or 1.33×10^7 dynes. As the slide moves back, the force needed to keep it moving decreases, and when the hammer is about half way down the force is only 7.3 kgm. But, as may be seen from Fig. 3, the bullet leaves the muzzle when the slide has moved only a very short distance, so that the initial value of the forward force is nearly the same as the average value over the short period we are concerned with. We therefore set $Q = 1.33 \times 10^7$ dynes, and upon inserting this value and those of A and M into equation (4), we have

$$P = \frac{1}{1.03}\left(578\,\frac{v}{t} + 1.33 \times 10^7\right) \qquad (5)$$

If v is expressed in inches/second and P in lb/in^2, the equation becomes, in terms of these more familiar units,

$$P\ (\text{lb/in}^2) = 0.0207\,\frac{v\ \text{in/sec.}}{t\ \text{sec.}} + 188 \qquad (6)$$

With formula 6 and the data given above

FIGURE 8. The bullet has now passed off the film, the slide has recoiled 0.35 of an inch. Note that as yet there has been no evidence of any gas leakage at the breech.

FIGURE 9. The original film clearly showed a slight cloudiness just at the breech, which has not been here reproduced. The empty cartridge case has been extracted and is about to be ejected. The slide is now back 1.25 inches.

FIGURE 10. The empty cartridge case is just being ejected. Note that the impact of the slide on the receiver now causes the pistol to begin to tilt upward for the first time, but when this occurs the bullet is approximately ten feet from the muzzle.

FIGURE 11. The empty cartridge case has now nearly cleared the slide in its counter-clockwise spinning motion.

FIGURE 12. The empty cartridge case has now cleared the slide and the slide is starting forward.

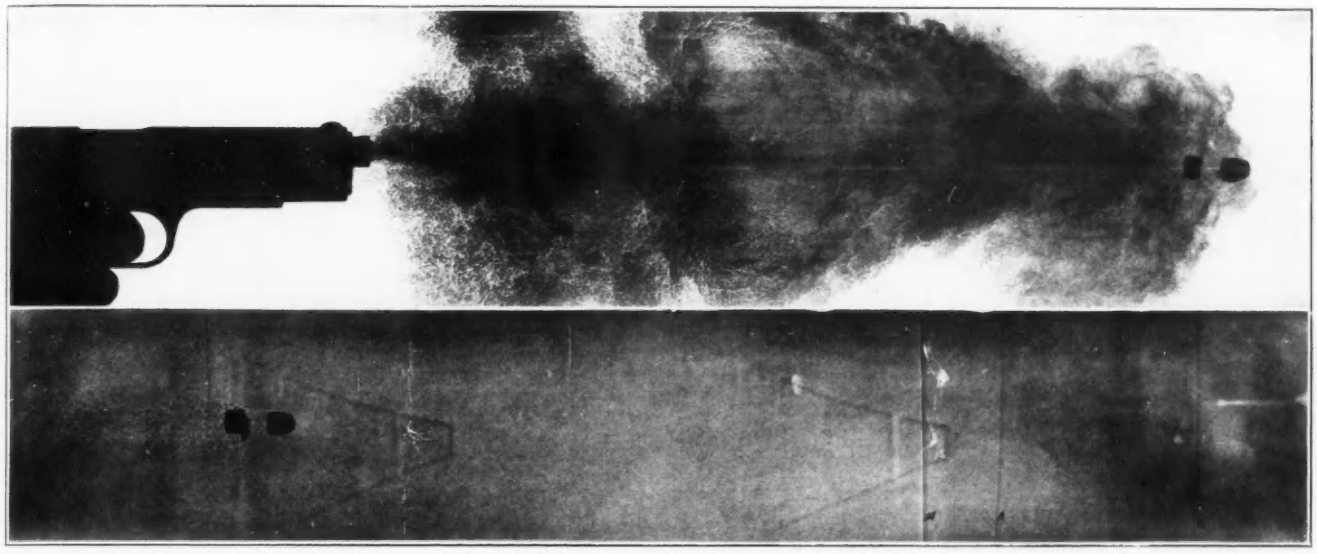

FIGURE 14. This photograph shows the slugs, etc., of one of the Remington Auto Riot Cartridges. The components are just beginning to separate.
Figure 15. This photograph shows the slugs and case (with the ball jammed inside) at a distance of 3 feet from the muzzle.

the pressure time curve in Fig. 19 was computed.

In the formula just derived we have considered only the average force F of the powder gases defined by

$$F = \frac{1}{t}\int_0^t F\,dt$$

If, however, the velocity-time curve, obtained from the space-time curve, were on a large scale and sufficiently accurate we could perform a second differentiation and so obtain the acceleration at any time t, from which an instantaneous pressure-time curve could be computed.

If v = the instantaneous velocity at the time t, and F = the instantaneous net force acting on the mass M, we have

$$F = M\frac{dv}{dt} \qquad (7)$$

If P = the instantaneous pressure, and Q = the instantaneous value of the retarding force or resistance, the net backward force is

$$F = PA - Q \qquad (8)$$

Hence by (7) we have

$$PA - Q = M\frac{dv}{dt}$$

or

$$P = \frac{M\frac{dv}{dt} + Q}{A} \qquad (9)$$

The values of M and A are known, and Q may be taken as approximately constant at the initial value already mentioned. Hence if the velocity curve were accurate enough so that we could depend upon the values of $\frac{dv}{dt}$ obtained from it, we could find the value of P for each value of t and construct a time curve of the instantaneous pressure. Unfortunately the recoil curve is not sufficiently accurate to permit of this second differentiation and we are forced to content ourselves with a curve of average pressures.

Since what has been obtained is in reality a curve of average pressure up to a time t, it is evident that the maximum of the instantaneous pressure curve must lie a good deal higher than the maximum of the average pressure curve. In any event the results are too low since in general we have taken no account of friction of the various parts, resistance of the bullet to forcing into the rifling and friction in the bore after it has started. Neglect of other factors though of comparatively small magnitude tends to reduce the values obtained below their true magnitude.

Surveillance tests of cartridges as old as those used in this experiment* sometimes show a pressure as low as 10,000 lbs. sq. in. but 12,000 to 13,000 lbs. sq. in. is a more common value. These pressures, however, were obtained with the copper crusher gauge and they also are too low, because pressures obtained with the copper crusher gage take no account of the inertia of the piston or the frictional forces acting on it or on the gas check cup ordinarily used.

The really serious defect of the copper crusher gage lies in the fact that the maximum pressure does not exist long enough for the metal to readjust itself completely. A somewhat analogous case occurs in skating over very thin ice. It is a comparatively simple matter to skate over very thin ice if one's speed is sufficiently great. This is true even when the ice is so thin that it could not possibly support the weight of the skater were he to attempt to remain at rest upon it. The vertical component of the force which the skater exerts upon the ice is constant and equal to his weight. However, the time during which this force is applied to a given point of the thin ice is so short that it does not have time to yield

* U. S. C. Co., 1918.

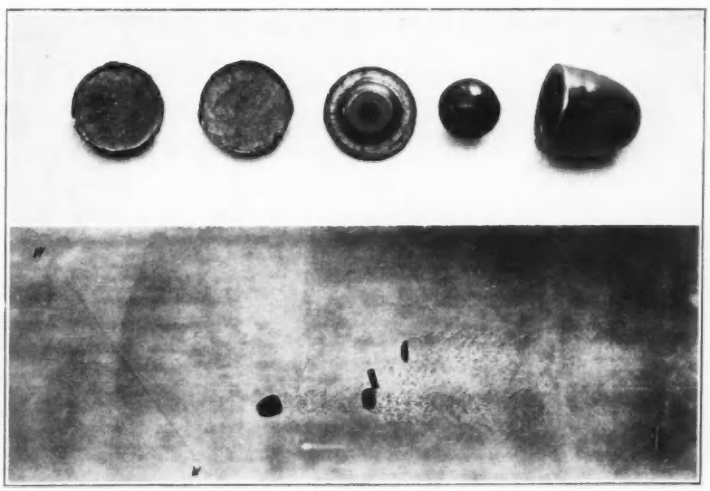

FIGURE 13. In this plate are shown the three lead slugs, ball and jacket or case of the 0.45 caliber Remington Auto Riot Cartridge.

FIGURE 16. This plate, which was unfortunately reversed in printing and not noticed until too late for correction, shows the components of the 0.45 caliber Remington Auto Riot Cartridge at a distance of 10 feet from the muzzle.

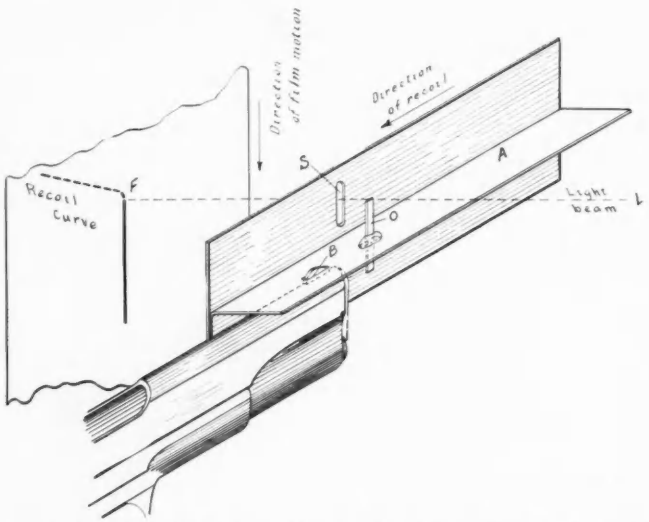

FIGURE 17. Figure 17 is a drawing illustrating the apparatus used to obtain the recoil-time curve of the Colt 0.45 caliber automatic. It consists, as indicated, of a "T" section of light sheet iron fastened to one side of the muzzle. In the upper half of the vertical sheet a slot "S" is cut. The purpose of this slot is to allow a narrow beam of light from an arc lamp to fall upon the film of the camera. In the horizontal shelf is mounted the short sheet-iron strip "O." The purpose of this strip is to produce a change in the illumination at the instant that the base of the bullet clears the muzzle. It will be seen that the upper end of the bar "O" normally covers the lower half of the slot "S," but at the instant its lower end is struck by the bullet it promptly rotates so that the upper end moves back towards the muzzle thus uncovering the lower half of the slot "S." Due to the fact that the camera has a cylindrical lens the effect of the sudden change in the illumination is somewhat masked but is nevertheless clearly visible as indicated at the point marked "X" in Figure 18.

While the slide is at rest the beam of light passing through the slot "S" throws a straight line upon the camera film. However, when the slide starts to move the curve traced out on the film is the resultant of the motion of the film and that of the slide.

It might be supposed that the bar "O" would not uncover the slot promptly but be cut off at the point where the bullet strikes it. This bar while being rather thin is about 0.1 of an inch in width, and since it is fastened in the horizontal sheet by only a small bit of soft wax, it rotates promptly when struck and with no appreciable lag.

The length of the sheet-iron slide attachment was necessary in order to prevent the light from the arc lamp from falling on the camera film after the recoil had occurred and before the camera shutter could close.

The horizontal shelf serves to prevent the leakage gases from obscuring the slot "S" and thus impairing the results obtained. The light from the flash of the powder gases is of no consequence, being most in the red end of the spectrum and therefore not affecting the photograph film appreciably.

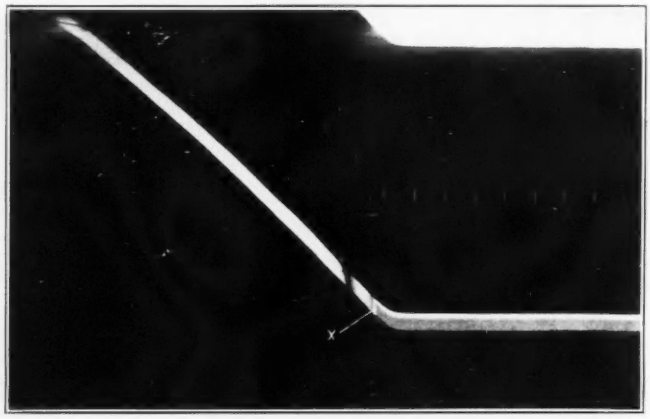

FIGURE 18. This plate shows the remarkably short time during which the slide receives its acceleration. The point "X" marks the instant at which the base of the bullet cleared the muzzle. The film moves from left to right and the recoil in this case is upward.

sufficiently to rupture, although the force applied is more than sufficient if exerted for a longer time.

By similar reasoning the duration of the maximum pressure applied to the cylinder of the crusher gage is too short to permit the copper cylinder to assume a length corresponding to that of an equal static load. Hence it is evident that the maximum pressures indicated by the crusher gage are also too low.

Where the maximum of an instantaneous pressure curve would fall with respect to the crusher gage values, providing the recoil curve had been sufficiently accurate for a second differentiation, it is of course impossible to say

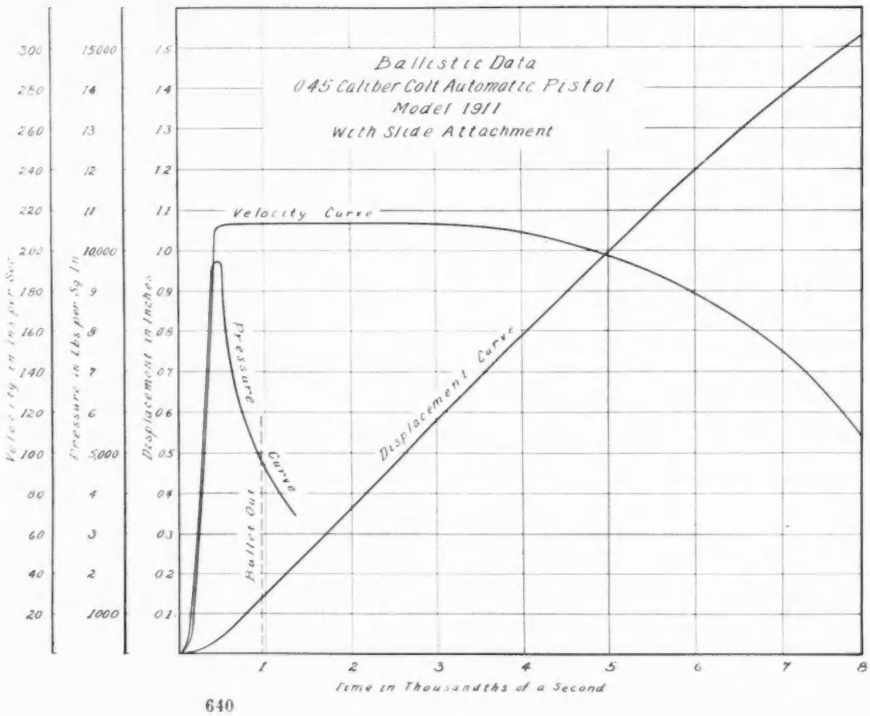

Figure 19. This plate shows an enlarged recoil curve, a velocity curve and an average pressure curve.

All that the pressure curve of Fig. 19 shows is the average pressure up to a given time, and as already pointed out the maximum of an instantaneous pressure curve must of necessity fall considerably above this value.

The writer takes pleasure in acknowledging the assistance he has received from Dr. E. Buckingham in the way of advice and suggestions in preparing this paper.

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A Short Cut to Exterior Ballistics

By Edgar Bugless and Wallace H. Coxe

Ballistic Engineers of the E. I. Du Pont de Nemours & Company

Part VIII. Determining the Wind Deflection

The chart for the determination of wind deflection of any small arms bullet trajectory is shown in Drawing No. 8. This chart, like the charts for the angle of departure and the time of flight, is self-explanatory and independent of the group once values for the known variables Z, muzzle velocity and angle of departure have been obtained from outside sources or preceding chapters. The velocity of the wind either has to be assumed or estimated. Drawing No. 8 is plotted by means of the formula:

$$D = \frac{W\ Z\ Dow}{V\ Cos\ \phi}$$

Where D = Wind Deflection in degrees
W = Velocity of Wind in miles per hour across plane of fire
Dow = Secondary Function depending upon Velocity and Value of Z
Z = Horizontal Range in feet for a standard projectile having a ballistic coefficient (C) = 1
V = Muzzle Velocity in feet per second
Cos ϕ = Cosine of Angle of Departure

The limiting values and spacing distances used in constructing Drawing No. 8 are given in detail in Table No. 8A. As in the previous drawings, an effort was made to simplify the reading of the various axes by graduating

Table No. 8A

TABLE OF VALUES USED IN CONSTRUCTING ALIGNMENT CHART FOR WIND DEFLECTION THROUGH A SOLUTION OF THE FORMULA WIND DEFLECTION $D = \frac{W\ Z\ D_{ow}}{V\ Cos\ \phi}$

Where D = Wind Deflection in Degrees
W = Velocity of Wind in Miles per hour across plane of fire
D_{ow} = Secondary Function depending upon Velocity and Value of Z
Z = Horizontal Range in Feet for a Standard Projectile having a Ballistic Coefficient (C) = 1
V = Muzzle Velocity in Feet per Second
Cos ϕ = Cosine of Angle of Departure

Name of Axis	Symbol	Number Limits	Log. Limits	Log. Difference	L	Actual Length	Scale No.	Equivalent Scale	Scale to Use
Horizontal Range for C = 1	Z	.73–20000	1.86332–4.30103	4.43771	3⅓	14.78	3	3	30
Secondary Function	D_{ow}	.002–.009	3.30103–3.95424	0.65321	20	13.06	0.5	0.5	50
Dummy Axis No. 1							3.5		
Wind Velocity	W	1–50	0–1.69897	1.69897	5	8.49	2	2	20
Dummy Axis No. 2							5.5		
Muzzle Velocity	V	825–3500	2.91645–3.54407	0.62762	25	15.69	0.4	0.4	40
Dummy Axis No. 3							5.9		
Cos Angle of Departure	Cos ϕ	.70711–1	1.84948–0	0.15052	100	15.05	0.1	0.1	10
Wind Deflection	D	.0000000417–15.4	7.62014–1.18752	7.56748	1⅔	12.56	6.0	6.0	60

Z – D_{ow} = 10" Dummy #1 = $\frac{3}{3.5} \times 10$ from D_{ow} = 8.59" from D_{ow} (called Reference Line on chart)

Dummy #1 – W = 8" Dummy #2 = $\frac{3.5}{5.5} \times 8$ from W = 5.1" from W

Dummy #2 – V = 8" Dummy #3 = $\frac{5.5}{5.9} \times 8$ from V = 7.46" from V

Dummy #3 – Cos ϕ = 10" Deflection = $\frac{5.9}{6.0} \times 10 = 9.84$" from Cos ϕ

In the construction of the chart for wind deflection as in the construction of the chart for angle of departure, it was found necessary to use a series of velocity axes due to variations in D_{ow} for different velocities. The axis for Cosine of angle of departure was simplified by being graduated directly in terms of the angle instead of Cosine of the angle as determined by the formula.

Table No. 8B

Caliber	Bullet	Muzzle Velocity	Ogive	Diameter of Flat Nose in Calibers	From Drawing 1 Coefficient of Form	Diameter of Bullet in Inches	From Drawing 2 Ballistic Coefficient	Z 300 Feet	From Drawing 3 Remaining Velocity in F. S. at 300 Feet	From Drawing 4 Angle of Departure in Minutes when X = 300 Feet	From Drawing 5 Time of Flight in Seconds over Range of 300 Feet	From Drawing 6 Maximum Height of Trajectory in Inches over Range of 300 Feet	From Drawing 7 Angle of Fall in Minutes when X = 300 Feet	From Drawing 8 Wind Deflection in Minutes or Seconds for 10 miles per hour cross wind over a range of 300 Feet
.22 Long Rifle	R. A. 40 gr. Lead	1070	2	....	0.85	0.222	137	2200	930	17	0.34	4.60	18.0	3.3′
.25/20 W. C. F.	R. A. 60 gr. Hi-Speed	2200	4	0.10	0.85	0.258	152	1975	1700	4.2	0.17	1.20	5.0	3.0′
.25/20 W. C. F.	Peters 60 gr. Hi-Speed	2200	4	0.08	0.75	0.258	172	1750	1750	4.0	0.17	1.10	4.8	2.9′
.25/35 W. C. F.	Peters 117 gr. Hi-Speed	1975	4	0.12	1.10	0.258	228	1300	1650	4.7	0.18	1.40	5.3	2.3′
.250/3000 Savage	Western 87 gr. H. P. Expanding	3000	6	0.08	0.70	0.258	267	1120	2630	2.0	0.11	0.55	2.3	1.2′
.250/3000 Savage	Western 100 gr. Lubaloy S. P.	2850	4	....	0.60	0.257	360	830	2580	2.2	0.12	0.60	2.4	55″
.270 Winchester	W. R. A. 130 gr. Ex. Pt.	2700	8	....	0.49	0.277	496	600	2500	2.4	0.12	0.65	2.7	41″
.30 Newton	Western 180 gr. Lubaloy Ex. Pt.	2500	8	0.07	0.70	0.308	385	780	2280	2.9	0.14	0.80	3.1	1′
.30/06 Spld.	R. A. 110 gr. Hi-Speed	3500	6	....	0.70	0.308	237	1260	3050	1.6	0.095	0.45	1.8	1′
.30/06 Spld.	Western 150 gr. Lub. Ex. Pt.	2700	6	0.10	0.70	0.308	323	925	2410	2.5	0.12	0.70	2.8	1.1′
.30/06 Spld.	R. A. 180 gr. Hi-Speed	2700	8	....	0.49	0.308	560	540	2520	2.4	0.12	0.65	2.7	36″
.30/06 Spld.	Western 180 gr. Ex. Pt.	2700	6	0.10	0.70	0.308	385	780	2460	2.5	0.12	0.68	2.8	55″
.30/30 W. C. F.	Peters 170 gr. M. C. S. P.	2000	1.5	....	1.00	0.305	261	1150	1710	4.4	0.17	1.30	5.0	2′
.30/40 Krag	W. R. A. 220 gr. M. C.	2000	1.5	....	0.95	0.308	348	865	1780	4.5	0.18	1.25	4.9	1.6′
.32 Colt Auto.	R. A. 71 gr. M. C.	825	1	....	1.10	0.312	095	3150	710	27.5	0.45	7.80	30.0	5′
.32 W. C. F.	W. R. A. 80 gr. Super-Speed	2000	4	....	0.75	0.311	158	1890	1550	5.1	0.18	1.50	6.1	3.5′
.32 Win. Spl.	R. A. 110 gr. Hi-Speed	2550	6	0.10	0.70	0.321	218	1370	2160	2.9	0.13	0.85	3.3	1.8′
.32/40 W. C. F.	W. R. A. 165 gr. M. C. S. P.	1500	3	0.17	1.10	0.320	209	1425	1240	8.4	0.24	2.50	9.7	3.3′
.35 Remington	Western 200 gr. Lub. Ex. Pt.	2000	4	0.10	0.75	0.359	296	1010	1750	4.6	0.18	1.25	5.1	1.8′
.38/55 W. C. F.	Peters 255 gr. M. C.	1700	2	0.20	1.25	0.376	205	1450	1395	6.3	0.22	1.90	7.5	3.0′
.40/65 W. C. F.	R. A. 260 gr. Lead	1420	2	0.22	1.25	0.405	180	1650	1160	9.2	0.24	2.70	11.0	3.7′
.40/70 W. C. F.	R. A. 330 gr. Lead	1380	3	0.23	1.15	0.405	248	1200	1190	9.7	0.25	2.70	10.8	2.7′
.40/90 Sharps	R. A. 370 gr. Paper Patch	1400	1.5	0.18	1.25	0.405	257	1160	1205	9.1	0.24	2.60	10.5	3.2′
.45/70 W. C. F.	R. A. 405 gr. Lead	1360	1.5	0.20	1.25	0.459	219	1360	1160	10.0	0.27	2.90	11.3	3.0′
.45/70 W. C. F.	W. R. A. 300 gr. M. C. S. P.	1890	1.5	0.25	1.35	0.456	153	1950	1460	5.8	0.20	1.80	6.8	4.1′
.45/90 W. C. F.	W. R. A. 300 gr. Lead	1550	2	0.25	1.25	0.458	162	1840	1220	8.5	0.24	2.50	10.0	4.2′

CHART FOR DETERMINING WIND DEFLECTION

Given—Velocity of Wind (W) across plane of fire in Miles per Hour. Value of Z. Muzzle Velocity (M. V.).

Angle of Departure (O).

Example—Find the angular deflection from the line of sight produced by a wind of 10 miles per hour across the plane of fire when using the 172 gr. Frankford Arsenal 1925 National Match Bullet over a range of 500 yards.

Velocity of Wind (W) = 10 m/h.
Value of Z = 2700.
Muzzle Velocity (M. V.) = 2750 F. S.
Angle of Departure (O) = 14′.

First Step

Locate Value 2750 in upper axis for muzzle velocity.

Second Step

Locate Value 2750 in lower axis for muzzle velocity.

Third Step

Connect these two values with a straight line, shown by dotted line on chart.

Fourth Step

Locate Value 2700 on Z axis.

Fifth Step

Locate corresponding values of 2700 on muzzle velocity axis for value of 2750. This is accomplished by locating 2700 on muzzle velocity lines 2500 and 3000 and connecting the two points, shown by broken line on chart. The intersection of the broken line with the dotted line is the point desired.

Sixth Step

Connect the Value 2700 located on the Z axis in Step Four with the point of intersection of the corresponding value of Z and the muzzle velocity value of 2750, and carry the line to the right until it intersects the Reference Line, giving Line No. 1 on Chart.

Seventh Step

Locate Value 10 on wind velocity axis.

Eighth Step

Connect point located on wind velocity axis with point of intersection of Line No. 1 and Dummy Axis No. 1, giving Line No. 2 on Chart.

Ninth Step

Locate value 2750 on muzzle velocity axis.

Tenth Step

Connect point located on muzzle velocity axis with point of intersection of Line No. 2 and Dummy Axis No. 2, giving Line No. 3 on Chart.

Eleventh Step

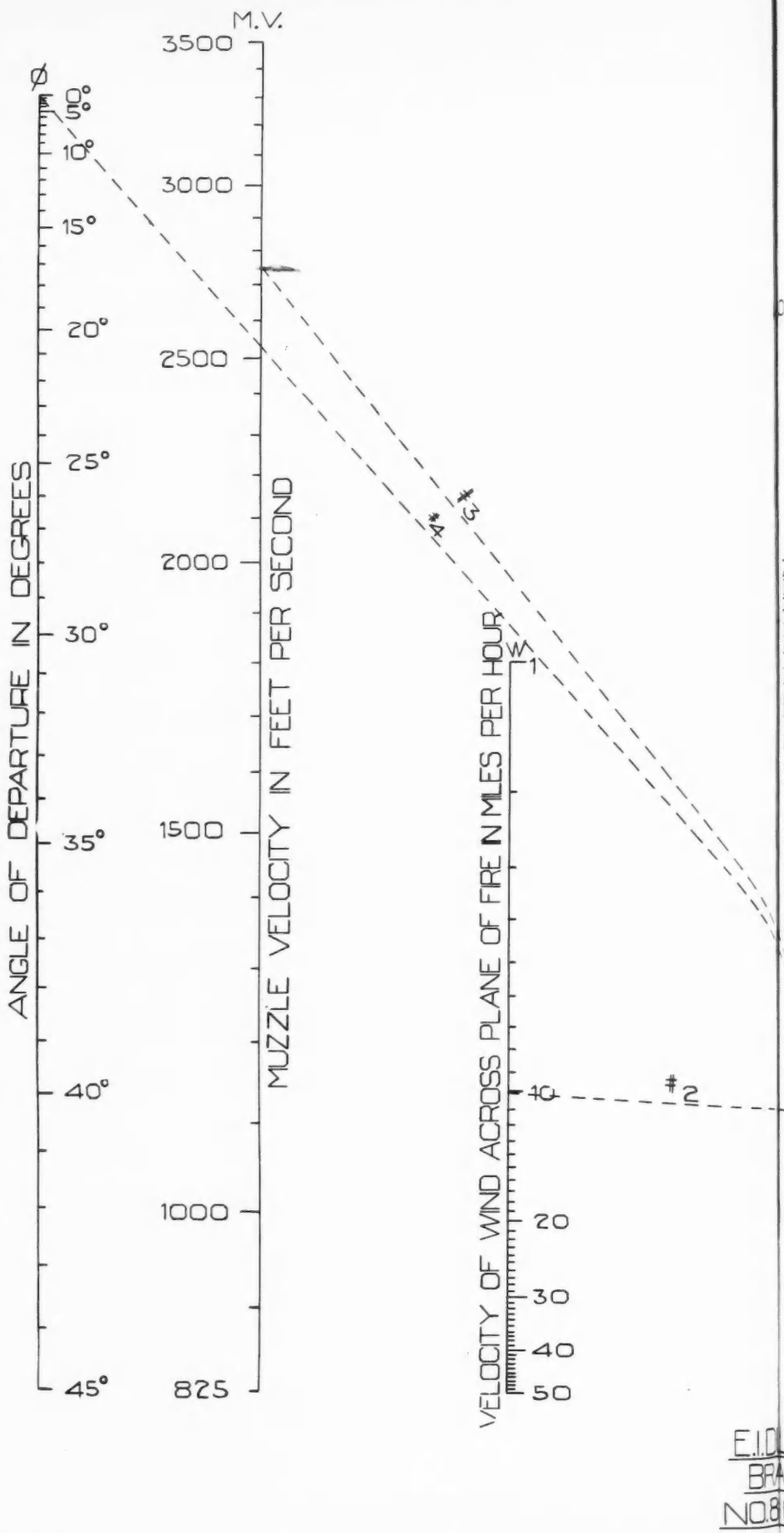
Locate Value 14′ on angle of departure axis.

Twelfth Step

Connect point located on angle of departure axis with point of intersection of Line No. 3 and Dummy Axis No. 3, giving Line No. 4 on Chart.

Thirteenth Step

The intersection of Line No. 4 with the Deflection Axis gives the required angle of deflection 3.5 minutes.



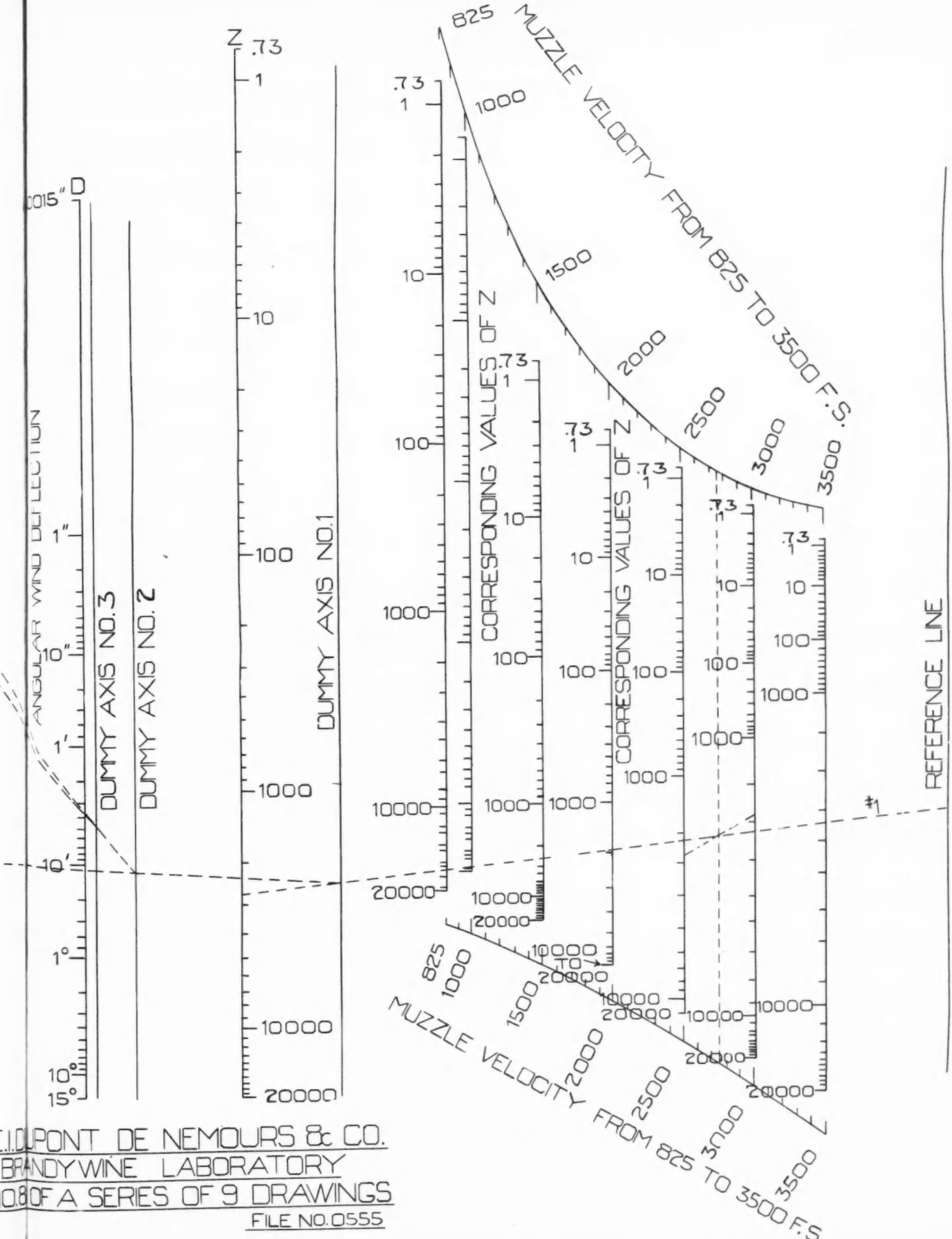


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Table No. 8C

TRAJECTORY CHARACTERISTICS OF THE .250-3000 SAVAGE 87-GRAIN BULLET AT A RANGE OF 300 YARDS WHEN STARTING WITH A MUZZLE VELOCITY OF 3000 FEET PER SECOND AGAINST A 20-MILE CROSS WIND

Characteristic	Formula	Calculated Result	Chart Reading
Ogive			6
Coefficient of Form (i)			.55
Ballistic Coefficient (C)	$C = \frac{W}{id^2}$	.35	.35
Muzzle Energy (E)	$E = \frac{MV^2}{2}$	1740 foot pounds	1800 foot pounds
Value of Z	$Z = \frac{X}{C}$	2571	2600
Remaining Velocity	$S^2 = Z - S^2$	2220 foot seconds	2200 foot seconds
Angle of Departure (ϕ)	Sin $2\phi = A C$	7 minutes	7 minutes
Angle of Fall (ϵ)	Tan $\epsilon = B'$ Tan ϕ	8.6 minutes	8.8 minutes
Time of Flight (T)	$T = CT'$ Sec. ϕ	.349 seconds	.36 seconds
Height of Trajectory (Y)	$Y = H X$ Tan ϕ	6.1 inches	6.3 inches
Wind Deflection (D)	$D = \frac{W Z \text{ Dow}}{V \text{ Cos } \phi}$	5.6 minutes	5.7 minutes

them directly in terms of the known values rather than in the functional values. For instance, the axis for the Cosine of the angle of departure was simplified by being graduated directly in terms of the angle of departure instead of the Cosine of the angle as used in the formula.

Table No. 8B included in this part contains all of the data of Table No. 7B given in Part VII of the series and is further expanded to include readings from Drawing No. 8 of values for wind deflection for a cross wind of 10 miles per hour over a range of 300 feet. Table No. 8C is a trajectory table for the 250/3000 Savage 87-grain bullet, which has been worked out as a further illustration of the manner of constructing a trajectory table.

A great many shooters are acquainted with the rule of thumb for calculating wind deflection. With the 150-grain Springfield bullet this rule was:

> Wind deflection in minutes is equal to the velocity of the wind in miles per hour multiplied by the hundreds of yards of range and divided by 10.

To illustrate—At 500 yards with a five-mile cross-wind the formula would be worked out as follows:

$$\text{Windage in minutes} = \frac{5 \times 5}{10} = 2.5 \text{ minutes}$$

This formula has worked very satisfactory and is a most convenient method for rapid calculation at the range. In the following table is shown the values for wind deflection as determined by this nomograph, as calculated by the rule of thumb, and as given in the Government pamphlet on the Springfield bullet.

TABLE OF VALUES OF WIND DEFLECTION IN MINUTES GIVING A COMPARISON OF THE RESULTS AS OBTAINED FROM (1) NOMOGRAPHIC CHART, (2) RULE OF THUMB, AND (3) GOVERNMENT PAMPHLET.

Cartridge	Bullet	Reading from Drawing Number 8	Calculated by Rule of Thumb	Government Pamphlet	500 Yd. Range No. 8	500 Yd. Range Rule of Thumb	500 Yd. Range Govt. Table	1,000 Yd. Range No. 8	1,000 Yd. Range Rule of Thumb	1,000 Yd. Range Govt. Table
5 Mile Cross Wind										
.30/06 Spl.	150 Gr.	2.3′	2.5′	2.22′	5.5′	5.0′	5.33′			
.30/06 Spl.	172 Gr.	1.9′	2.17′	.....	4.5′	4.36′	.....			
20 Mile Cross Wind										
.30/06 Spl.	150 Gr.	9.0′	10.0′	8.88′	22.0′	20.0′	21.32′			
.30/06 Spl.	172 Gr.	7.0′	8.72	.....	18.0′	17.4′	.....			

Note (1) Drawing No. 8 refers to drawing in current issue of THE AMERICAN RIFLE.

Note (2) Rule of Thumb refers to rule—
Wind deflection in minutes for the .30/06 Springfield 150 gr. bullet = Velocity of wind across the plane of fire in miles per hour multiplied by the hundreds of yards of range divided by 10.
Wind deflection in minutes for the F. A. .30/06 Springfield 172 gr. bullet = Velocity of wind across the plane of fire in miles per hour multiplied by the hundreds of yards of range divided by 11.5.

Note (3) Government pamphlet refers to table of wind deflection in pamphlet No. 1923 entitled, "Description and Rules for the Management of the United States Rifle."

Note (4) There is no government pamphlet on the wind across the plane of fire in miles per 172 grain Boattail bullet.

The Rule of Thumb worked out for the 172 grain bullet in the above table is a rather clumsy figure to use on the range where a divisor of 11.5 is involved. This can be simplified, however, and the same results obtained by using the following formulas:

(a) Windage in minutes for ranges under 500 yards = Velocity in miles per hour times hundreds of yards of range times .8.

(b) Windage in minutes for ranges between 500 and 1,000 yards = Velocity in miles per hour times hundreds of yards of range times .9.

It has been explained before that variations in components and in individual rifles will be reflected in the actual shooting; that is, that no curve or calculation can exactly foretell how any given rifle or set of components will perform and at the best will serve merely as an indication. This is especially true of the boattail bullet, which so far has not been thoroughly reconciled with Ingall's Ballistic Tables.

These series of nomographs have been designed to include all bullets from the .22 Long Rifle to the .50 calibre. However, a question has arisen in regard to the .22 calibre Short with its 30 grain bullet. This bullet was purposely omitted from consideration as its range is so short. The drawings are sufficiently flexible, however, to permit of its being included should such a course be desirable. In Drawing No. 3 the W axis can be extended by a pencil line for a distance of one inch below the 40 graduation and this new point be marked 30 grains for this particular bullet weight.

Worked out from the curve or from calculation, the value of ballistic coefficient C is equal to .0765. Owing to the extremely light weight and low velocity of this bullet, however, the C axis limit of .09 can be used in place of the calculated value without any appreciable loss in accuracy. As an illustration of this, Table No. 8D, in which values for the remaining velocity, angle of departure, striking energy, Z, and maximum height of trajectory as well as wind deflection have been taken from the curve with this assumed value for C of .09 in direct comparison with the same values as calculated for C of 0.0765. A study of the table will readily show that beyond a range of 100 yards the values of these various elements of trajectory are so great as to place very little dependence on the performance of the bullet. Further, the error introduced by using a greater value of C than that calculated has very little influence on the trajectory. In other words, the performance of the bullet beyond a range of 100 yards hardly merits the work involved in calculating or reading a trajectory table.

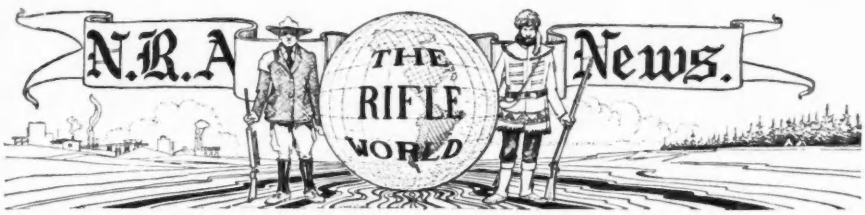
(To be continued)

Table No. 8D

TRAJECTORY TABLE OF .22 CALIBRE SHORT 30 GRAIN BULLET AT RANGES UP TO 500 YARDS STARTING AT A MUZZLE VELOCITY OF 950 FOOT SECONDS AGAINST A 10 MILE CROSS WIND

Range	R. V.	ϕ	E	Z	Y_6	D
Extend W 1" to 30 and use C = .09						
0	950	0	58.2	0	0	0
50	860	10′	47.6	1670	1.4"	2.6′
100	800	22′	41.3	3330	6.5"	5.8′
200	680	49′	29.8	6670	30"	12′
300	585	90′	22.1	10000	85"	19′
400	500	120′	16.1	13350	170"	26′
500	430	180′	11.9	16700	330"	34′
Calculated C = $\frac{W}{id^2}$ = .0765						
0	950	0	58.2	0	0	0
50	855	10′	47.6	1960	1.4"	3.4′
100	778	21′	38.4	3920	6.5"	6.8′
200	648	49′	27.0	7840	32"	14′
300	539	85′	18.7	11760	90"	22′
400	449	133′	13.0	15680	196"	30′
500	373	193′	9.0	19600	370"	40′

R. V. = Remaining Velocity in Feet per Second
ϕ = Angle of Departure in Minutes
E = Energy in Foot Pounds
Z = Horizontal Range in Feet for Value of C equal to 1
Y_6 = Maximum Height of Trajectory in Inches
D = Wind Deflection in Minutes



Conducted by C. B. Lister

An Interesting Report from a Unique and Successful Rifle Club

La Mar

On Washington's Birthday, 1924, two clerks in the Des Moines, Iowa, Post Office discovered that they were not good shots. They had attended a shoot that day. That evening as they were discussing their bad scores, two other clerks, J. C. Wood and B. R. LaMar, who knew what the National Rifle Association was doing for the shooting game all over the United States, suggested that a Rifle Club be organized, and that scores would improve. Discussion followed, a meeting was planned, data was secured, and the Des Moines Post Office Rifle Club was formed after about a month, with a membership of thirty. Then followed a struggle to fill out the forms in the proper manner to get our material from the War Department, iron out the differences between members, and perfect the club into an efficient working machine. Some fair shooting was done by some of the old-timers, by the last of 1924.

The Des Moines Post Office Rifle Club is composed almost exclusively of new membership and is limited to postal employees. Owing to the fact that we work on tours of duty at all hours of the day and night, we shoot at times ordinary shooters would not like. The morale of our club is higher, perhaps, because of the fact that we members have so many interests in common. As the number of postal workers eligible to join our club living in this city is about 500, we have the raw material for a large club, in time.

At the beginning of 1925, seventeen of our thirty members dropped out. Of the seventeen, nine had too little spare time or too many other interests, four were shooters, but dropped out because they felt that they didn't fit (in spite of all efforts to keep them in the club); one got enough shooting in the National Guard, one had a serious illness, and two felt that they could not spare the money for dues, although the dues had been cut from five dollars per year to four.

We got seven members during 1925, one of whom learned how to shoot in the Roumanian Army twenty-eight years ago.

In February a "Club Members Indoor Match" was staged. It proved to be the most successful match of the year, from the standpoint of turnout and enjoyment. Our executive officer, J. C. Wood, got a local jeweler interested in the match and as a result the jeweler presented the winner and the runner-up with engraved badges.

The Des Moines Police Force and our club stages a five-man pistol match in May, and a five-man rifle match in July. Both were over selected courses, and proved disastrous to our record in both cases.

Then followed practice for the record qualification matches. Two Sundays at wide intervals in the fall were used for firing for record, and we now point with pride to the fact that we have in our club one expert, five sharpshooters, and five marksmen. One sharpshooter received his rating in 1924. Eight members could not be induced to come out and fire for record, in spite of all efforts to interest them. Course "D" was fired, and compared with the record of 1924, when the highest score made on the same course by any member of our club was 212, we consider that we have improved greatly. Several informal challenge matches between club members have been shot off from time to time, some of them with very amusing results.

Prior to January 1, 1925, we used the indoor rifle range of the 168th Infantry, Iowa National Guard, through the courtesy of Major G. C. Greenwald. About that time, with the help of the late Postmaster Thornburg and our superintendent of mails, P. A. Brown, the club officials received permission from the treasury department to use the top floor of the post office building for an indoor rifle range. The post office building is of stone and concrete construction, and the top floor, which was used in part for storage purposes, had plenty of room for a rifle and pistol range up to 125 feet in length. So about February 1 we started building our own gallery. (See drawing at end of report.)

The cost of the materials, which was approximately $70, came out of the club treasury, and the work of construction, drafting the plans, and the like was done by the club members voluntarily. The steel and the lumber was purchased at wholesale cost, as we have a member who was at the time employed part time at a steel company, and a former carpenter is on our roster. Much experimenting to determine angle of rebound and the like was necessary before work was started. The principle of the gallery is the rebound or deflection of bullets striking steel at an angle of 45°, down into about six inches of medium fine sand in the bottom, is the idea, originally, of Ex-Officer J. C. Wood.

The gallery is twelve feet wide exclusive of wings, seven feet high, and seven feet long at the bottom. Three overlapping ¼ in. steel plates reflect even a .45 cal. bullet, the bottom, is the idea, originally, of Ex-steel jacketed, without a trace of having been fired upon. The targets, four in number, are held in place by two No. 9 wires strung across the gallery, about 12 in. from the steel at the top and a foot from the front, which makes them about four feet from the floor. Clothes-pins hold the targets in place, and when shot away are cheaply replaced. Flange nuts on eye-bolts keep the wires tight. Steel wings ⅛ in. thick set on hinges at the sides of the gallery open out and when set at an angle of 45° will reflect a .45 cal. steel jacketed bullet into the gallery (although the steel is dented), and will close as doors and lock on the front when the gallery is not in use. About ¾ yd. of medium fine sand was placed in the bottom of the gallery, 6 in. deep at the back and nothing at the front, and receives practically all the force of the bullets. Lighting is supplied by four 75-watt globes in home-made reflectors of ordinary tin.

The location of the gallery on government property almost prohibits the public from witnessing the matches, and that is the only drawback to conditions being ideal.

We have no outdoor small bore range, but hope some day to lease enough suitable ground for a 200-yd. .22-cal. range, so we can stage running deer, rising bear, etc., matches in natural surroundings.

In the fall of 1924 our club received a proposition from an amusement park just organizing, to come out and use some of their land for a small bore range, in return for holding our matches there and bringing them business. However, we found later we would be required to buy stock in the company to an amount that would cost more than we could buy enough GOOD land for a splendid range. So we gracefully withdrew.

Des Moines, Iowa, is fortunately situated midway between two good rifle ranges, the Iowa National Guard and the Fort Des Moines ranges. The officials at Fort Des-Moines have cooperated with our club in every way; allowed us free use of their range, lent us telephones, ordnance stores, etc., and have proven themselves courteous and obliging gentlemen in every respect.

The Des Moines Post Office Rifle Club can not, as yet, point to any conspicuous service rendered the public. Our match publicity all helps to keep the shooting game, or, in other words, the country's defense, before the public eye, which might be considered a benefit. Our indoor range is open to the mail truck drivers for supervised pistol practice (one of our members

coaches them) and they are now better fitted to guard the public's valuable mail, for men who at first missed a target two feet square by a margin of five feet at twenty-five yards, now hit the bullseye. When important mail is transferred in Des Moines, usually some of our rifle club members are sent along to guard it.

Four of our club members are individual members of the N. R. A. All the returns of matches fired by these men are not here yet, so it is impossible to state whether or not we have any N. R. A. match winners in our club. None of the members of the Des Moines Post Office Rifle Club has been to Camp Perry yet, but there are two or three likely prospects who have been shooting possibles with iron sights, and hope to mingle with the good ones of the national convention of riflemen before long.

We have had the most success in keeping our club interested by the "talk-it-up" method. All the club members work near one another, more or less, and if each shooter tells about the good times we have together, the scores we make, and the progress we are making, everybody keeps interested. Posting the best gallery targets or the results of the outdoor matches on our bulletin board in the workroom of the Post Office always draws interest. On our yearly "Invitation Day" all postal employees are invited to try their luck on the range free of charge, and we usually get a few members then.

* * *

INDIANA STATE SHOOT

The annual indoor shoot of the Indiana National Guard and Indiana State Rifle Association will be held at Culver Military Academy March 29. This is one of the most important matches in the country and attracts wide attention. Excellent arrangements have been made for handling the matches. The program follows:

RIFLE MATCHES

Unlimited Re-entry Match—50 ft.—Prone position.
Two sighting shots and ten shots for record.
Sights—Any.
Target—50 ft. N. R. A.
Prizes—Special prizes announced later.
Entry fee—25 cents.

Unlimited Re-entry Match—50 ft. 00 off-hand.
Two sighters and 10 shots for record.
Sights—Any.
Target—50 ft. N. R. A.
Prizes—Special prizes announced later.
Entry fee—25 cents.

Ind. Championship Match—50 ft.—Prone position.
Four sighting shots and 20 shots for record.
Sights—Any.
Target—50 ft. N. R. A.
Prizes—Gold, silver an dbronze medals.
Entry fee—50 cents.

Ind. Championship Match—50 ft.—off-hand.
Four sighters and 20 shots for record.
Sights—Any.
Target—50 ft.—N. R. A.
Prizes—Gold, silver an dbronze medals.
Entry fee—50 cents.

Team Match—50 ft.—Prone position.
Five competitors per team, all scores to count for record. Competitors will shoot on but one team. Any number of teams may be entered from one company or club.
Four sighting shots and 20 shots for record fired by each member of the team.

Sights—Any NOT CONTAINING GLASS.
Target—50 ft. N. R. A.
Prizes—The Military Trophy will be awarded to the highest team representing the Indiana National Guard. The Indiana State Rifle Association Trophy will be awarded to the highest team representing the civilian clubs.
Entry fee—$2.00.

PISTOL MATCHES

Unlimited Re-entry Match—50 ft.
Ten shots for record.
Target—Standing American 20 yards.
Prizes—Special prizes announced later.
Entry fee—25 cents.

Ind. Championship Postal Match—50 ft.
Ten shots for record.
Target—Standard American 20 yards.
Prizes—Gold, silver and bronze medals.
Entry fee—50 cents.

Unlimited Re-entry Pistol Match—25 yds.
Arm—The service pistol or service revolver, calibre .45.
Course—Ten shots for record—slow fire.
Target—"L."
Prizes—Special prizes announced later.
Entry fee—25 cents.

Individual Pistol Match—25 yds.
Arm—The service pistol or service revolver, calibre .45.
Course—Ten shots for record—slow fire.
Target—"L."
Prizes—Gold, silver and bronze medals.
Entry fee—50 cents.

Pistol Team Match—50 ft.
Five competitors per team, all scores to count for record. Competitors will shoot on but one team. Any number of teams may be entered from one company or club.
Ten shots for record fired by each member of the team.
Target—Standard American 20 yards.
Prizes—Gold, silver and bronze medals.
Entry fee—$2.00 per team.

RULES GOVERNING MATCHES

Each rifle and each pistol team will consist of five members representing their respective companies or clubs. A member of one rifle or pistol team will not be permitted to fire as a member of any other team.

Transportation: Each National Guard company will be allowed transportation for one team consisting of five members, providing the company has had the necessary preliminary instruction at its home station. However, as many additional teams or individual members of companies may be brought as desired, at their own expense. All National Guard organizations that desire to send a team to this competition will apply direct to the Adjutant General for authority and transportation, stating in their requests whether or not they have .22 calibre gallery rifles or pistols, the amount of instruction the team members have received, and a statement as to the amount of shooting they have done.

Team Matches: These matches will be fired on the Standard N. R. A. 50-feet target, which consists of six bulls, one for sighting and five for record.

Each contestant will be allowed four sighting shots, which will be optional with the participant. Each competitor will fire two shots for record on each of the five record bulls. However, if a competitor fires more than two shots on a record bull, he will be allowed to count all shots fired, providing the total number on the record bulls does not exceed the number of record shots allowed for the match. If the total number of shots on the record bulls is in excess of the number allowed, the excess will be deducted and those deducted will consist of the shots of highest value.

In other words, if you happen to fire three shots on a bullseye, be sure and fire only one on the next. You will be allowed only TEN record shots on the five record bulls. Firing more than ten shots on the five record bulls will not cause your target to be thrown out; it means that ten shots will be counted and the excess shots deducted will be those of highest value.

Eligibility: These matches are open to all National Guard Companies, and to all civilian rifle clubs affiliated with the Indiana State Rifle Association and in good standing; and to individual members of the Indiana State Rifle Association.

Rifle—Any .22 calibre rifle weighing not more than 12 pounds may be used.

Pistol—Any .22 calibre pistol may be used. Barrel not over ten inches in length.

Targets—N. R. A. targets will be used and will be furnished at the range.

Ammunition—Any .22 calibre rim fire may be used. Ammunition will be furnished at the range for those who desire it.

Firing—All firing will be done without artificial support. N. R. A. Rules will govern.

Matches will begin at 8:00 A. M., March 29, 1926, and continue until all matches are finished.

Team captains will report to the Secretary, in the Recreation Building, Culver Military Academy, immediately upon arrival, for registration and assignment of sleeping quarters. Cots, blankets, pillows and mattresses will be furnished by the Culver Military Academy. Competitors will be required to furnish their own meals. Arrangements have been made with the Culver Military Academy for all competitors to eat in the Academy Mess Hall. Meals will be 50 cents each.

Competitors should arrange to arrive at Culver during the afternoon of March 28.

AN INTERESTING REPORT FROM SALT LAKE

The following extracts from the annual report of the Salt Lake City Rifle and Revolver Club will be of interest to all followers of the sport. It will be noted that while the qualification course attracted the greatest interest, the so-called International Free Rifle Match took second place in interest. There seems to be a growing interest among the shooters of this country in the sporting possibilities of the International 300 meter target with its relatively small bull'seye and counting rings.

Three paragraphs of particular interest relate to cooperation with the police department, the Regular Army at Fort Douglas and the Federal Reserve Bank guards. Cooperation of this kind is the sort of public service that puts a rifle club in solid with the newspapers and public-spirited citizens of its community.

"A copy of the program for outdoor matches during 1925 is enclosed herewith. The 'Qualification Course' in each instance proved the greatest drawing card. Considerable credit for this must be given to the desire to qualify for insignia rather than to the competition direct. Of the special matches arranged during the season the International, Free Rifle took second place in interest.

"The Club has its own indoor facilities which are located in rented quarters. There are six .22 rifle 75 ft. targets which can be used at the same time. Also four 60 ft. pistol targets which can be used at the same time (2 small bore and 2 large bore), so that ten shooters can be accommodated. The Club has no outdoor small bore range and improvises stands for such shooting.

"The outdoor military range at Fort Douglas is used by the Club under permission of the Commanding Officer. This is a permanent range which answers all of our requirements. The Club has no outdoor range of its own.

"The Police Department are permitted to use the Club's indoor pistol range free of charge. This is being done regularly and the Club's relationship with the Police Department is cordial.

"There have been no joint activities with the National Guard but a very kindly relationship exists with the Army personnel located at Fort Douglas, Utah. There has been splendid cooperation in connection with 'National Rifle Day' and a Utah Special State Shoot, also in connection with the tryouts for the International Team held here last year.

"The Federal Reserve Bank guards are permitted to use the Club's indoor pistol range at a nominal charge, representing cost of light, targets, etc. There are ten of these guards, who shoot twice each month and are supervised and instructed by a Club Member. A remarkable improvement is noticed in the shooting of these men."

* * *

WATTS TEAM MATCHES

The Waterloo High School Rifle Club desires team matches, telegraphic or exchange by mail. These matches are to be shot with metallic sights and in fifty-foot galleries. Communications should be made with Craig Ellyson, Secretary, 409 Home Park Bldg., Waterloo, Iowa.

UNIVERSITY RIFLEMEN DEFEAT GUARDSMEN

The University of Pennsylvania Rifle Team opened its indoor season with an auspicious start when it defeated a team representing Company H of the 111th Infantry, P. N. G. Each team consisted of five men firing ten record shots in each of the three positions, prone, kneeling and standing.

The guardsmen acted as hosts to the University riflemen, the match being fired on the range at the 111th Armory in Philadelphia, January 21st. The firers shot in pairs and it was evident from the beginning that the University team felt the loss of four of last year's members. Feaster, Graves, Dodson and Williams were missing from the Pennsylvania lineup, the latter firing against his alma mater on the guard team.

Despite the handicap of four new, untried men and only one veteran, Pennsylvania took the lead at the close of the first stage and maintained it.

The scores:

University of Pennsylvania

	P	K	S	Agg.
Lerch	98	80	82	260
Douglas	97	90	83	270
Ball	97	93	83	273
Wood	99	93	91	283
Valgenti	99	97	96	292
	490	453	435	1378

Company H

	P	K	S	Agg.
Kernaghan, Q	99	77	76	252
Kernaghan, T.	95	89	82	266
Rooney	97	89	81	267
Sykes	98	89	84	271
Williams	100	95	97	292
	489	439	420	1348

* * *

CHICAGO RIFLE ASSOCIATION ANNUAL MEETING

The annual meeting of the Chicago Rifle Association for 1926 was held at the Hamilton Club range.

The rifle clubs represented in the association are:

Hamilton Rifle Club.
Irving Park Rifle Club.
Centennial Rifle Club.
Ridgeville Rifle Club.
Hawthorne Rifle Club.
Chicago Rifle Club.
Bell Telephone Rod and Gun Club.
Commonwealth-Edison Rifle Club.

The following officers were elected:

President, G. R. Brown, Hawthorne Rifle Club.

Vice-President, W. Purdy, Hamilton Rifle Club.

Secretary, K. W. Selander, Bell Telephone Rod and Gun Club.

Treasurer, H. A. Williams, Hawthorne Rifle Club.

Executive Officer, C. E. Nordus, Ridgeville Rifle Club.

Publicity Officer, D. S. Seymour, Chicago Rifle Club.

The Tribune Trophy was officially turned over to the Hamilton Club Rifle Team, winners in the recent City Championship Tournament. Medals were awarded to the team members and to the individual winners.

A record team match, to be fired on the New England quarter-inch bullseye at 75 feet, was scheduled for March 5, 1926. The winning team in this match will be awarded the Insull Trophy.

The Chicago Rifle Association, B. E. Sunny Trophy is to be awarded to the local club making the highest aggregate score in the National Rifle Association Inter-club Team Match which is to be fired during February.

Plans have been formulated for an active program of shooting at the Ft. Sheridan rifle range during the coming outdoor season.

HOW THE SAN LUIS OBISPO PEOPLE REPLENISHED THE CLUB TREASURY AND MEMBERSHIP ROLL

"The San Luis Obispo, California, Rifle Club recently put over a New Year's shoot with very good results, both financially and in the way of new members who have the sport of rifle shooting at heart and will make lasting members.

"Every one who attended the shoot and fired, received very substantial prizes in merchandise. These prizes were donated by the public spirited merchants of San Luis Obispo, who had the promotion of rifle practice at heart. The local banks also donated substantial cash prizes. The prizes were many and varied, so consequently, every one could pick a prize to his liking. The club donated in the way of prizes several annual memberships in our club, subscriptions to The American Rifleman and Outdoor Life.

"All shooting was done at 200 yards standing and any rifle with any sight not containing glass.

"The 'L' pistol target was used, the ninth ring being blackened to give a better sighting bull.

"Here's where the money comes in for the treasury. Three shots were fired for record, the first three at 50c and any subsequent re-entry at 25c. Number of re-entries unlimited. High score to have first choice and so on down the list. Ties were decided by the next highest score a contestant had to back up his highest score.

"This type of shooting arouses the keenest kind of good natured competition and is a departure from the sometime cut-and-dry military shooting and you will be surprised how the off-hand scores will improve after shoots of this kind.

"The advertising of the shoot was done at a very nominal cost by the use of handbills placed in business houses and autos several days in advance and by our local papers which carried a front page news column of the shoot and list of prizes and names of the donors.

"These shoots are one of the best drawing cards we have for getting new members and most desirable members, as the ones we get are the ones that are real riflemen and lasting members."

News of the N. R. A. J. R. C.

(A Unit of the National Rifle Association devoted to teaching every boy and girl in America the safe and accurate handling of the rifle.)

The Boy and The Man

By L. Q. Bradley

NOT the man spelled with a little "m" and defined as an individual with whom it is "all the same" if he has successfully or unsatisfactorily passed the Youth stage (or perhaps better and more clearly classified as an individual old enough to wear long trousers). No, not such a man as *that* would one dare compare with the BOY, the Youth—the Hope of coming generations. But rather is this heading, this comparison aimed at the "Big M" Man. The Man who is big in reality, big enough to stand out as a goal for our boys to look forward to reaching; and in summary, the Man who *is* a Man!

There are only two classes of men, and our boys, our youngsters of today will inevitably fall into one of these classes. You boys, when you are a little older, will you be satisfied to merely be a "grown person," a little "m" man? Or hadn't you rather devote and dedicate your youthful efforts to nothing short of a MAN, a real American He-Man!

It might be said that the first half of our lives is divided into three separate and distinct periods; and these three early stages might be briefly traced as follows:

(1) The Boy: This is the beautiful age, the time through which God's own loveliness shines on laughing, care-free faces. Indeed, it is the harvest period of joy and happiness that comes to every father and mother, and which only they themselves are privileged to fully enjoy. Happy is the father who in his son recalls his own youthful days, and in his boy is proud! This tender age, like those childhood days not far behind, should be filled with sunshine, for our Maker has provided that these ages are to be enjoyed by both young and old.

(2) The Youth: It is true that the youth's character, his life and how he will apply it, is not only partly, but almost wholly moulded during this all-important period. As the boy departs from his childhood days to take his first real step in life, he becomes what we term as a "youngster" and starts life anew. He no longer looks on life as a matter of course, but thinks of himself as having some part, some important role in life. The youth, the once happy-skipping, care-free school boy, (and a little boy at that) is now a big lad, high-school age, and as he enters high school, he takes upon himself a certain sense of responsibility. A duty to perform! Seriousness begins to become noticeable as he realizes his place among other youths, the place he will soon acquire among young men. And realizing these things, he more fully grasps the reasons of his being, and begins to think of that profession, some accomplishment in which he has been led to be interested and to which he desires to dedicate his future efforts. The "danger-line" must be approached and crossed during the youth age. The turning point or crisis of the boy's life must be dealt with at this time. In this connection, the importance and necessity of continuously teaching and instilling Self-control is certainly worthy of mention. Show me a youth who has been taught both at home and in school the meaning of self-control, and who in turn has allowed that teaching to be applied to his own life, and confidence with regard to his safely passing the danger line with flying colors is immediately restored. Likewise give the world a boy who knows how to control himself and you may rest assured that the under-world will encounter much difficulty in attempting to break down his former teachings, his home and school training. Yes, self-controlness is the foundation of every good thing to be taught and the necessity for an early instillation of this great trait in the lives of every boy and girl in America cannot be too strongly or too frequently emphasized. All boys have a remarkably keen imagination, which when correctly encouraged may become a valuable asset or, on the other hand, when neglected may be equally as harmful. Although rough, and seeming absurd thoughts are the result of their "imaginary thoughts" at first, nevertheless this imagination in boys can be converted into an envied qualification when carefully and closely supervised. It is to be remembered that the men of the day are and have always been endowed with the ability to give to the world good clear "quick-thinking" thoughts. Also that the boy who loves to imagine (and imagining *is* thinking whether good, bad, foolish, or sensible) is molding a field of *good* or *bad* thinking. The Youth age is being treated in such length because it is the most important, the more delicate of any stage through which the boy must pass. Habits both good and bad are more frequently acquired between the age of 16 and 21 than any other period. It is the duty of every mother and father, of every teacher coming in contact with these youths, to encourage them in the good habits as they form them, and to help them get through the dangerous stage without attaching to themselves those habits which we know are sure to prove detrimental, and that will bring disappointment and regretfulness later.

(3) The Man: And now we approach the third and last age before reaching manhood, real maturity. This is the "capital M" Man, the kind we look forward to, yes, even dream of our boys as being. And if his training has been followed along the lines suggested, this writer feels that the boy and youth who may once have been the joy of his home, is fully and ably prepared to go out and enter life in its stage, to take up his duties as a man, and to deal with men *as* men, remembering always those things learned in his youth, the most important of which inspires him to "Do unto others as he himself would have them do unto him." On the Coast down in Mississippi there is a military preparatory school, which, by the way, is one of the best academies of its kind in the southland. That school has adopted as its motto: "Send us the Boy and We'll Return You the Man." The fact that the institution closely adheres to the policy of returning Men (the kind of men we are discussing here), can possibly be attributed to its success with regard to the correct and careful training of boys. **The Junior Rifle Corps** having devoted the past six years to "training every boy and girl in America the safe and accurate handling of the rifle"; and endeavoring through its Resolves (ask the boy what they are), to instill in these same boys and girls a desire to be prepared when the final stage is reached, considers itself worthy not only of the confidence, but also the cooperation of every father, mother, and adult who themselves are striving just as it is toward helping them reach the same goal. And so, with apologies to the Mississippi Academy, we insist that if "You'll lend us the Boy, We'll give you the Man!"

MATCH PROGRESS

Unfortunately, due to blizzards and snow storms all over the country the past two weeks and because of the fact that many of our Units are not in possession of an indoor range, thus forced to shoot "when they can" during this season of uncertain weather, the returns from Winner Seal Matches arranged for the week ending February 6th have been coming in mighty slow. For this reason, it has been thought best to allow a universal extension to all Units, in which to complete these matches. This will cause a little delay in the announcing of results from matches arranged that week, but we believe that those Units who have the indoor ranges, or who, better still, did not have to go through with this stretch of wintry weather, will gladly indorse Headquarters' action in granting this extension to those not so fortunate as themselves. Just as soon as these returns are in, the winners will be announced and seals forwarded without delay.

INDIVIDUAL MATCH

It is our desire that every boy and girl interested in rifle shooting be entered in the National Individual Junior Championship Match, scheduled, as previously announced, to start early next month. We at headquarters have been very busy the past week getting out announcements and entry blanks to all the instructors. Every Instructor has been notified of this match, and has been informed of the conditions governing it. They have each been furnished with Unit Applications with which to enroll as many of the Units as desire to participate. And in every mailing to the members each day, a notification together with individual entry blank is inclosed, so that those who may not be members of Units will have an opportunity to enroll, and to shoot in this National Competition. We will be glad to furnish the necessary information and entry blank to any boy or girl who hasn't received this information. Remember that the entire match is open to any member, no qualifications required, and no entry fee. Let's make the 1926 National Individual Junior Match a record-breaker in both results and popularity. You can help do it.

MEDAL CONTEST

If you were at National Headquarters and could see all the targets and enrollment forms coming in each day you would think that the various Units were having a spirited contest to see which one could send us the most material. Returns are coming in so fast from all corners of the country that we are a little behind. Please be patient.

We fully realize that our members are anxious to receive their awards as soon as possible, and we don't like to disappoint any one. We're expecting our new medals any day now, and will in the near future be caught up and will then give you our usual prompt service once more.

EXPERT RIFLEMEN

Isn't it a "grand and glorious feeling" when we've demonstrated that we can accomplish things that at first seemed utterly impossible? This is the real reward for effort. We do not attach as much importance to a medal that is won as to the fact that we have attained that which we went after.

When a member receives a letter from National Headquarters with "Expert Rifleman" attached to his name, we know that he has learned to "Hit Where He Aims," and that he has really attained something very much worth while.

A diploma is sent to all members of the Corps who have submitted target qualifications and these are really of more value to you than the medal. It is possible that you might lose your medal, while wearing it, but the diploma is something that should be framed and hung in your home or club room. It is a fine thing to own a medal, but it is finer still to possess that which goes with it, the ability to shoot.

During the past month the following have qualified as Expert Riflemen, placing the bullet in the bullseye 500 times in the four positions:

Albert Edmonson, St. Louis, Mo.
John Kelley, Los Angeles, California.
Henry Weidemuell, St. Louis, Missouri.
Albert Diamond, Fresno, California.
Joseph Forkos, Chicago, Illinois.
Bernice Shockey, Council Bluffs, Iowa.
Clara L. Wallace, Council Bluffs, Iowa.
Dow D. Rogers, Pasadena, California.

Many of our members who have qualified as Experts are seeking higher honors and have been shooting conscientiously for the Distinguished Rifleman bar. To date but thirty-one have qualified for this distinction, but this is as it should be, for only those who can accomplish such a course should be entitled to this honor. Any one who can place six hundred shots in the bullseye equally as well in the four positions can be proud of their achievement, and you can rest assured that we at National Headquarters are proud of them.

The following have been added to the honor list of Distinguished Riflemen.

Antone Paczik, Detroit, Michigan.
Silas Mennie, Detroit, Michigan.
N. Henig, Detroit, Michigan.
Albert Diamond, Fresno, California.

This year, as in all previous years, a great deal of credit is due our members who organize Units. Out of the large number of Units organized it is safe to say that a majority are organized through the persistent efforts of our individual members. Unit No. 22 was organized back in July, 1918, at the Trinity M. E. Church in New Haven, Connecticut. This Unit has peen active during the past seven and one-half years, reorganizing each year with some new members.

Two of our boys who were formerly members of Unit No. 22 have given to the Corps a real service. First, we will mention Orrin Rutledge. Orrin was making rapid strides toward becoming an Expert Rifleman when he unfortunately took ill and was obliged to suspend with his rifle practice for a period. He soon recovered and later went to Mohonk School, Mohonk Lake, New York, where he organized a real live Unit of the Corps, which has been operating for the past two years. This Unit has been taking an active part in our complete program, and is well up in the standing of Units entered in the Winner Seal Matches.

In June, 1924, Orrin took part in the National Rifle Day Matches, conducted in New Haven, and won the City Championship. He was sent by the local luncheon clubs to participate in the National shoulder-to-shoulder matches held at Camp Perry that fall, and came in fourth in the standing.

We must also mention Gurdon Chatfield, who has tried hard to organize a Unit in the High School. He kept plugging away until he now has several excellent Units organized with teachers as Instructors. The sport became so popular that enough members enrolled so that there are now two boys' Units and one girls' Unit. These Units are also entered in the Winner Seal Matches. Gurdon as manager has also affiliated the Unit with the N. R. A. Junior High School Clubs.

Several High Schools in the State of Connecticut have rifle teams and Gurdon is now working toward a Connecticut State High School Rifle League of eight teams.

Every boy who has been an organizer deserves honorable mention, but we will have to be content this time to mention just these two.

Considerable mention has been made of the Waterbury, Connecticut, Units in these columns, but under the leadership of Chief Instructor Joseph Colloty these members continue to accomplish new things.

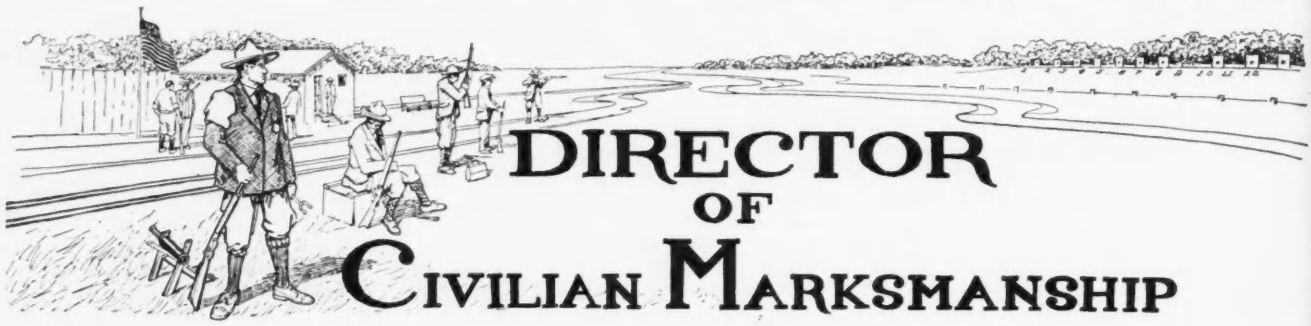
Four years ago Chief Instructor Colloty organized his first Unit No. 1884, a boys' Unit, in the Crosby High School in Waterbury. The sport became popular immediately under the leadership of Instructor Colloty, who is Supervisor of Physical Education in the Schools. A Unit No. 2303 was soon organized at the Leavenworth High, a girls' Unit No. 2535 at Crosby High, and then another girls' Unit No. 2786 and a boys' Unit No. 2903 at the Wilby High. The young people have taken to the sport as a duck to water, and now Waterbury is an honest-to-goodness city of rifle shots.

In the weekly matches conducted by mail between Units throughout the country, the Units have done exceptionally well. At first their object was to submit perfect team scores of five hundred, but this goal was soon accomplished

It was the "A" rings they were after, and last week in its match with Unit No. 823 of Brooklyn, N. Y., Chief Instructor Colloty's efforts were rewarded when Unit No. 1884 submitted a possible five hundred with 100 A's—a remarkable feat. This is the first possible all A's which were ever turned in by any Unit in the Winner Seal Matches.

Our hats off to the members of Unit No. 1884, and Chief Instructor Colloty. How's that for a record to shoot at? Are we going to have more Units submitting all A's? That's up to you to decide!

Word has just been received from Mr. Henry R. Buck, formerly Instructor of Unit No. 1168 of Hartford, Connecticut, that one of his boys, Matthew Raddon, had made the Naval Academy Rifle Team at Annapolis, Md. Matthew qualified as an Expert Rifleman in the Junior Rifle Corps, and in 1922 won the Local Championship of Hartford in the National Individual Championship Matches, conducted annually. It always pleases National Headquarters to hear of the progress of its members, and we join with every member of the Corps in wishing Matthew continued success.



DIRECTOR OF CIVILIAN MARKSMANSHIP

Conducted by Lt.-Col. G. C. Shaw

NEW PISTOL COURSE

Recently the record course and the requirements for qualification for the pistol and revolver has been changed. The new course follows:

Timed fire—Target L

25 yards—30 seconds per score—2 scores.

Rapid fire—Target L

15 yards—11 seconds per score—2 scores.
25 yards—15 seconds per score—2 scores.

Quick fire—Target E (Bobbing)

25 yards—3 seconds per shot—3 scores.

A score will consist of five consecutive shots instead of seven.

Classification.—The method of calculating qualification will remain the same as heretofore—namely, the percentage method.

Pistol Expert.....At least 85%
Pistol Sharpshooter....At least 78%
Pistol Marksman.....At least 60%
Unqualified .....Less than 60%

Forms for reporting the new course are now being printed. On the back of the form will be printed the rules and regulations. Club secretaries desiring copies of this form are advised to write to the D. C. M. after March 1st, when they should be ready for distribution.

Caliber .38 Revolver Ammunition

There is a supply of about 500,000 rounds of revolver ammunition, caliber .38, stored at Frankford Arsenal, and available for sale to N. R. A. members. Recent tests have shown this ammunition to be in serviceable condition. It is packed in cases of 3,000 rounds and will be sold in case lots only at $30.00 per case, no packing charge. Send orders to Director of Civilian Marksmanship with money order or certified check.

Losses by Fire

Recently several clubs have reported that they have lost property by fire. They have requested to be relieved of responsibility for this lost property without paying for same. This cannot be done. All property lost, damaged, or destroyed must be paid for. Attention is invited to a clause in the bond filed by each club which states as follows: "Insure and keep insured against loss to the United States."

All clubs should take out an insurance policy to protect themselves against loss. Many clubs have done so already, but others have not. If a club has not covered their club house ranges, and property against loss and wishes to assume the risk of loss, they must keep in mind that any government property damaged or destroyed must be paid for.

Send in Returns

A great many clubs have failed to send in their Annual Property Return, and Report of Firing. The forms for making these very necessary reports were mailed to all Club Secretaries December 28, 1925, with the request that they be filled in and returned to this office by February 1, 1926. To date only about one-half of the clubs have sent them in. There is now being mailed to each delinquent club a memorandum requesting that these reports be mailed so as to reach the D. C. M. not later than March 1st.

This memorandum invites attention to the law and regulations under which issues of government supplies were made to the clubs. One of the requirements of the law and regulations is that the "Annual Return (Statement) of United States Property" will be rendered to the D. C. M. Another is that the "Report of Firing" shall also be sent in.

Failure on the part of any rifle club to comply with the prescribed regulations will be considered sufficient cause for the prompt withdrawal of the government property in its possession. This office does not wish to withdraw the supplies from any club that desires to retain them for proper use, but all clubs must understand that this office has no authority under the law or the regulations to allow a club to retain the stores, if the club fails to render the required reports.

The failure to send in these reports may be due to various reasons. It is suggested that interested club members see their club secretary and ask him if the required reports have been sent in to the D. C. M. If they have, no damage is done. If they have not, you may be the one to prevent the withdrawal of the stores.

* * *

In reading the letter accompanying a qualification sheet recently received by this office the following was noted. The writer stated "Personally I can't qualify any more as I have earned the Expert with the bar." This is erroneous, and for the benefit of any others who may have the same idea, the correct information is published.

Any one qualifying for the first time in any particular grade will be issued the appropriate insignia for such qualification. No badge will be issued for any qualification lower than that already made. Every subsequent qualification will be recorded, and for the third will be issued a requalification bar, and an additional bar will be issued for each three qualifications. The only exception is that no requalification bar is issued for requalification as Marksman.

All shooters already qualified as Expert or Sharpshooter may be issued requalification bars for each three qualifications and there is no limit to the number of bars a person may win. If a shooter lives long enough, and has the necessary ability he may have a string of bars hanging down to his waist or lower. Many basic expert badges with many bars have been seen where the wearer has qualified and requalified repeatedly with many arms.

JEFFES HEADS AUSTIN RIFLE CLUB

At the Annual Meeting of the Austin, Texas, Rifle Club held in the offices of the Chamber of Commerce in that city, the following officers were elected for 1926:

President, E. W. B. Jeffes; vice-president, T. E. Armstrong; secretary-treasurer, Marvin Kreuz; executive officer, Will Armstrong; range officer, Jesse Raven, and team captain, John Callan.

Three executive officers for the year were also elected for the year, they being G. L. Peterson, W. A. Palmquist, and Tom Kellum, retiring president. Marvin Kreuz was re-elected to the office of secretary-treasurer. After all officers had been elected, further plans were discussed for the year, and the matter of having a dual rifle meet with the San Antonio club was discussed. It has always been the custom in years past to stage a meet with the Alamo shooters, as being one of the biggest drawing cards of the year for both clubs. San Antonio offered the Austin club a date at the end of January, but it was deemed advisable to defer the shoot until the middle of February.

It is very probable that a new organization will be formed as a co-ordinate branch of the rifle club, because of the rapidly increasing demand on the part of girls to join the club.

THE DOPE BAG

A Free Service to Target, Big Game and Field Shots—All questions answered directly by mail

Rifles and Big Game Hunting: Major Townsend Whelen **Pistols and Revolvers: Major J. S. Hatcher**

Shotgun and Field Shooting: Captain Charles Askins

Every Care is used in collecting data for questions submitted, but no responsibilty is assumed for any accidents which may occur.

A Russian Sporter

By Townsend Whelen

I HAVE a 7.62 Russian rifle with 23-inch barrel, fitted with sporting stock and a windgauge peep sight mounted on rear of cocking piece. Like this rifle very much and it seems to be quite accurate.

I want to work up some reloads and wish to ask your advice about the best bullets. The groove diameter is .313 and barrel seems to be tightly chambered, as a .32-20 metal case bullet will remain in neck of expanded (fired) cartridge, and a .3145 cast lead bullet is a tight fit and requires some effort to seat it in fired cartridge case. This latter bullet—Gebhard 170-grain, plain base—shoots very well with about 10-grs. of du Pont No. 75.

Is a .32-20-115 metal case bullet too small for this barrel and will erosion, gas cutting or pitting be likely to occur if I use this bullet with 10 or 11 grains of No. 75 or No. 80 (du Pont).

I tried this load, but as necks of cartridges were not resized and did not grip bullet firmly, there was more vertical than horizontal deviation at fifty yards. Groups about 1½ in. x 2½ in. Have been told that .303 Savage or .303 British bullets may be used.

Do you think the 215-grain .303 British bullet is two large to be used with safety at a velocity of about 2000 f.s. and what powder charge would you recommend?. Would you regard this action as being as strong as the Springfield or Mauser actions? I understand some of these Rusian rifles have been altered to use the .30-06 cartridge. May get one of them. My sporting stock and windgauge sight could be fitted to the .30-06 barrel and action.

Am also thinking of getting a .25-20 repeater, but remember reading in your book "The American Rifle" that this rifle has a short-lived barrel when used with factory smokeless loads. Could one get as long barrel life as in larger size cartridges if he used only reloaded cartridges in .25-20? Or do charges in small size cases always burn hotter than similar loads in large cartridge cases?

I have a .22 Savage H. P. 20-inch barrel, in perfect condition. Would this rifle with reduced charges and lead bullets be as satisfactory for small game and for target shooting as the .25-20 with reloaded cartridges?

P.S.—Would you regard it as being dangerous to shoot bullets of the 2000 f.s. type through a greased barrel? When hunting small or medium size game with a .30-cal. rifle and mid-range or reduced charges, I may want to use lead bullets which of course means grease in chamber and in barrel. At such times occasion may arise where one has a chance at larger game, and no time to clean bore. Hence my reason for wanting to know if the 2000 f.s. load could be fired with safety in greasy barrel.

I have shot .22 Savage H. P. at 2800 f.s. with heavy steam cylinder oil on bullets (in warm weather) with no disastrous results, and no purst primers. But I will not do it now since I have learned better. I know the 2000 f.s. ammunition does not develop any such pressure, but in cold weather I should be afraid of any grease that hardens on bore as the effect would be much the same as shooting an oversize bullet.

R. N. D.

(Answer by Major Whelen). As the groove diameter of your 7.62 Russian rifle measures .313 inch, jacketed bullets should measure as near .313 inch, and lead bullets as near .314 inch as possible. At least this is the ideal. It is presumed that when a .313-inch bullet is seated in the case the resulting cartridge will enter the chamber readily. From what you say a .3145" bullet makes the cartridge a little too tight at the neck for easy seating, so we will probably have to size the lead bullets a little smaller than .3145", say to 3135".

I know of no jacketed bullets which measure .313". The nearest are those of the .303 British, .303 Savage, and .32-20 W. C. F., all of which measure about .311 inch. All these should do well in your rifle. Most probably you would not be able to notice any difference in accuracy and gas cutting between .311-in. and .313-in. bullets. The difference in accuracy would probably only slow up in a machine rest, and would be very slight. Erosion and gas cutting never amount to anything with reduced loads. It is only with charges that have velocities around 2,000 f.s. and over that erosion becomes apparent, and even the difference between a tight bullet (.313) and a loose bullet (.3085" to .311") is so small that the difference in accuracy life would probably not be more than 500 rounds.

You ought to get good results with a .32-20-115 grain metal cased bullet with from 10 to 20 grains of Du Pont No. 75 or 80 powder, and good results with 150 to 170 grain lead and tin plain base bullets sized .313 to .3135 inches, with 10 to 12 grains of Du Pont No. 75 or 80 powder. In each case the necks of the cartridge cases should be resized and expanded so that they are about .309 inches inside for .311 inches metal cased bullets, or the exact size of lead bullets. When you force a lead bullet into a case which is small at the neck you automatically but roughly resize that bullet down to almost neck size. For lead bullets the sharp corner at the mouth of the case should be chamfered off to prevent scraping and cutting the bullet as it is seated. The Bond reloading tool has a chamfering reamer attached to it.

The following are the maximum safe charges for 7.62 Russian rifle using .303 British and .303 Savage bullets measuring around .311 inch.

Bullet Weight	Powder Charge	Approximate M. V.
215	38 grs. Du Pont No. 16	2150 f.s.
190	39 grs. Du Pont No. 16	2275 f.s.
175	41 grs. Du Pont No 16	2400 f.s.

You can also use the 150 grain .30-06 service bullet, or the 148 grain 7.62 Russian bullet with 48 grains of du Pont No. 16 powder, getting about M. V. 2800 f.s. but the accuracy and gas cutting won't be quite as good as in the above charges. That is theoretically the results won't be quite as good. Sometimes one gets practical results from war rifles (which were made with rather large tolerances) which don't agree at all with what we would expect theoretically.

I know nothing of the Russian rifles which have been altered to take the .30-06 cartridge. I would rather advise that money be saved towards the purchase of a .30 cal. sporting type of Springfield, then you will have a real rifle.

With regard to the .25-20 rifle, I can thoroughly recommend the new Winchester Model 53 solid frame rifle which is now made with a nickel steel barrel. It should be used only with the Winchester make of low pressure or high-velocity smokeless cartridges, both having 86 grain metal cased bullets These are the only two makes of .25-20 cartridges which are loaded with a cool burning nitro-cellulose powder, and the only two makes which I know of with which the bore can be kept free from corrosions and pitting by proper cleaning. Both cartridges are accurate and reliable, and the combination of this rifle and ammunition is exceedingly satisfactory and useful.

It is dangerous to shoot any cartridge in a rifle the barrel or chamber of which contains heavy grease or heavy oil. The slight greasing of the chamber from use therein of grooved and lubricated lead bullets is not enough to be at all dangerous. The bore and chamber may, however, be coated with a light coating of light oil without running into any danger or trouble, except that when using lead bullets and light loads the first two or three shots fired through the oiled bore are liable to strike a little high and wide.

WANTS COMBINATION GUN

I am very much interested in a 7-mm. rifle. I want this gun built over a Springfield action, or rather I want a combination gun. I have a fine Springfield Sporter and want a combination of barrels for this gun. Could I have a take-down feature? I had thought of sending this rifle to Niedner and have him make a 7-mm. barrel with straight taper, 24 inches in length. I would have him turn down my Springfield barrel to the same outside dimensions as the 7-mm. barrel and build me a nice stock. Of course these barrels would have to be interchangeable. Could it be done with perfect satisfaction? I had thought of having a small square lug based underneath the barrels, to be used as a starting lug. A small wrench could be made to fit this lug and force could be applied at this point to start the barrel off. This lug could also be used to attach a swivel to. I would expect to have a recess of steel set in the forearm of the stock, for this lug to fit in. When the barrel is fitted to the stock, a swivel could be made to pass through this recess of steel and screw into the starting lug. This would do away with the barrel band and give a good strong swivel for a sling. This combination would be two perfect guns. I would want the weight about 7¾ to 8 pounds. With this combination one would have a perfect game rifle, both for large and small game. I have always thought the 30-06 too much of a gun for deer. But the 7-mm. with its 139-gr. bullet would be about right. I believe in the man with one gun. If one is accustomed to a certain gun it is the best gun for him. The Springfield Sporter as sold by the D. M. C. is too heavy for me, even with stock remodeled about 8½ pounds, which is as light as on can get them down to.

If the above plan can be worked out, I thought of getting a complete receiver assembly, with 48 Lyman attached and have a 7-mm. barrel fitted. Could the same bolt be used for both receivers? Both barrels could be made of the same outside dimensions and one stock would be all that is necessary for the combination. Would this be a better plan? I much prefer the other. I do not want two complete guns. In fact I now have two Springfield Sporters and I change my mind about twice a day as to which one I like best. I like the stock on the light one best but there are other points I like best on the other. Of what use are two fine guns of the same caliber? I admit that I am a gun crank and look at all my guns on the average of three times a week, pet them a while and think about them a great deal. We have excellent hunting of its kind in this country, better than most of my friends (gun cranks) but I do not see the use for two Springfields. Ihave two 45 Auto and I can't decide which I like best. There is no difference in accuracy. It is the same with the Springfields. I expect to dispose of one Auto, and one of my Sporters, but which one—that's the question. I sold a good 44-40 once upon a time and I have wished for it and tried to get it back many, many times. Although I have another, I am not satisfied. Are all my brother gun cranks like me?

Please let me hear from you as soon as possible. I am very anxious to get this settled and know of no one better able to settle it for me than you. Give me H——. I don't mind that. I have had my share of shooting both with shotgun and rifle and fired many rounds with revolver and pistol. This country furnishes good targets. Not black spots on a sheet of paper, although we have a fine Government range here. I never let a week go by that I do not burn some kind of powder. Please do not think by my remarks that I do not respect the target shooter. I do a great deal of that. In fact even jack rabbits are getting scarce and the little prairie dog is wise. Shoot him through and through and he will manage to scramble to his hole—wonderful targets though. Just one thing more, for hunting. Use a 4-inch bull at 150 yards, Major. I want to give my method of setting sights regular Springfield front sight, set your Lyman down as far as it will go on the receiver bridge, when windage is correct, tighten it. Now fire a few shots with your favorite ammunition and file down front sight until it centers the 4-inch bull. As soon as you are satisfied you are correct. Send front sight to Lyman and have him make you either gold or ivory bead same height as the filed down one. How is that, Major? But of course that is no news to you. I would not start on a hunting trip with a Lyman 48 cocked up about ¼ to ½ an inch. Have her flat on the bridge, then a glance is all one needs. I always drop a bit of soft solder on the windage screw. Its easy to remove when you get home. T. G. P.

Answer (by Major Whelen). The reason why the Springfield rifle is very much more accurate than most rifles is because of its *stiffness* from muzzle to butt-plate. It has no slots cut in the barrel, no takedown action, no butt-stock secured to the receiver by two tangs and a screw. Of all these the most inimicable to accuracy is the takedown action. Even if it be made as tight as possible in the screw, as you suggest in your letter, using a small spanner wrench to tighten it up, it will still affect the accuracy of the rifle considerably. Certainly it will enlarge the groups several inches at 200 yards, and moreover it will make a considerable variation from day to day as to where the rifle centers its groups. It is only a question of a short time when such a take-down action as you describe will become loose. Often when one screws the barrel into the receiver he screws it in just a little too far, prhaps only 1-100-inch, which can hardly be seen by the eye. Next time the barrel goes in easier. Pretty soon it screws in very loose, and all the time accuracy has been getting poorer and poorer. There is considerable difference in the accuracy of two Springfieds, one with a barrel that requires only a very slight pressure with the long handled wrench to set it into place, and the other in which the barrel is tightly screwed in, and also soldered in place.

The sporting type of .30 caliber Springfield rifle as made at Springfield Armory, with the 1922 pistol grip stock and the No. 48 receiver sight, is the most accurate rifle in the world. It is regularly tested for accuracy for acceptance at a range of 220 yards, using National Match ammunition. At this range almost every one of these rifles group their shots inside of a 2-inch circle. I know of no other rifle which will do anything like this. Most of the best of other makes group their shots inside a 2-inch circle at 100 yards. It has been found that this super-fine accuracy is due in no small degree to the short type of forearm, to the way in which the barrel is bedded in this forearm, rather tightly, and to the way in which the encircling barrel band binds the barrel down to the forearms. At least when these features are altered one begins to get about 2-inch groups at 100 yards. But if this rifle were made into a takedown I imagine that the groups might easily be twice as large.

With the Springfield the same bolt cannot be used for two receivers unless it happens by luck that it breaches up right, giving the correct headspace with each of the rifles. Only a factory having a headspace gauge can tell this. It is dangerous to fire a Springfield that has too much headspace, particularly with war time ammunition, or ammuntition made with cases having too soft anneal.

Having explained these things, we will now come to your particular case.

I am rather of the opinion, that while the .30-06 cartridge is the best in the world for sporting purposes as it is for target purposes, and is suitable for any American game, and for all but African and Indian thick-skinned game, yet in many cases it is too much gun for our sportsmen. It is decidedly the gun for the Northwest where large bear, moose, and caribou are met. But in many cases our sportsmen, particularly the light men, cannot fire it with quite the accuracy that they can a slightly lighter rifle on account of the recoil. It is the shots that hit in the right place that count.

There is very little need for a rifle as heavy as .30-06 in the United States except perhaps for elk. The .30-06 is not an ideal all-round rifle. The lightest charges that can be used in it will, for example, destroy most of the meat on a grouse if the bird be hit in the breast. It is too heavy for mink, weasel, etc., even when used with the lightest charge. That is, the pelt will be ruined.

I regard the 7 mm. Mauser cartridge as being almost ideal for an all around rifle for use in the United States and to the South. When used in a properly designed Niedner barrel, in a proper bolt action and stock, it is almost, if not quite as accurate as the .30-06 up to 500 yards. Beyond that the ability of the 30-06 to buck the wind makes it superior. The recoil is very much lighter than that of the .3$-06. The Western Cartridge Company are now making ammunition for 7 mm. rifles which they put the same pains on as they do on .30-06 ammunition. Moreover the bullets of this ammunition are jacketed with Lubaloy which does not give any metal fouling. It is for this ammunition, and this only, that Niedner makes his barrels.

The 7 mm. is by no means a small game rifle. During the past year I have had dozens of letters from sportsmen all over the country who have used this caliber for the heaviest game, and invariably they are exceedingly enthusiastic about it. A group of sportsmen who have ben hunting in Yukon territory for years will have nothing else. It kills cleanly with one shot. The bullet to be preferred seems to be the new Western 175-grain bullet, M. V. 2300 f.s., which has a very thick jacket, and comparatively little lead exposed at the point. The 139-grain bullet, M. V. about 2850 f.s. in a 26-inch barrel, is liked very much for deer, sheep, and goats. I worked up a reduced load consisting of 17 grains of Du Pont No. 80 powder and the 139-grain full-jacketed pointed bullet which I feel sure will be fine for small game where one does not wish to blow his game all to pieces. One of my friends has used this load on small game on a big game trip, and he says it does not have sufficient killing power, that it failed to kill even rabbits. I am rather in doubt about this. But if this is so, then in your country one should be able to kill quail quite well with it and still have something left for the table, and also in case it does not kill well enough we have a number of lead alloy bullets available which will slightly increase the killing power on small game. It does seem to me that a rifle for this cartridge would be most ideal for your part of the country.

What I would advise in your case is that you send one of your rifles to Niedner and have him fit it with a 7 mm. barrel, rifled and chambered for the 175-grain Western cartridge. The barrel should be solidly screwed into the receiver. To bring the weight to not more than 8 pounds the barrel should be 24 inches long, and should have the following dimensions: Starting at the receiver the diameter of the barrel should be 1.18-inch, and cylindrical in shape for a distance of 1.25 inch from the receiver. Then there should be a straight taper for a distance of 1.50-inch, at the forward end of which the diameter of the barrel should have tapered to a diameter of .88-inch. From there to the muzzle the barrel should have a straight taper, and at the muzzle it should have a diameter of .63-inch.

The sight should be a Howe-Whelen sleeve sight, and a Lyman gold bead front sight with 1-16 inch bead. I do not know how you are fixed for stock, but if you have no suitable stock Niedner can make you exactly what you wish. Or if you wish to economize, R. D. Tait of Montague, Cal., is making some mighty fine and reasonably priced sporting stocks for the Springfield, which would fit your rifle correctly. These made of a good grade of American walnut cost about $18.00. One of these stocks might be obtained and sent to Niedner to complete the fitting.

I do not know of any better or more satisfactory rifle, considering the use to which you wish to put it, and your present situation.

OLD CASES

YESTERDAY while firing my Krag rifle, I had trouble with the cases on my reloads. On ejecting the case, after firing the first shot, I found that the neck showed small longitudinal slittings and the shoulder showed a crack extending about half way around it. Primer was considerably, but not excessively flattened. Recoil and report no more pronounced than usual. I fired the second shot from the hip to avoid having gas spurt into my face in the event of another defectice case. This case showed the same kind of neck and shoulder splitting. Then looking down into the magazine I found that *the third cartridge had broken off right around the shoulder,* spilling powder all through the magazine. I picked up another cartridge and gave the bullet a sharp bend with my fingers. *The neck and bullet snapped right off* with great ease. Other cartridges exhibited the same weakness.

The cases were of Frankford Arsenal make, 9-09, purchased from a dealer last fall. The load was 35.3 grains of du Pont No. 16, behind the standard 220 grain bullet, to develop 32,140 pounds pressure and 2,001 ft. per sec. velocity. Winchester No. 2½ primers were used. The cartridges had been fired once before with the same load. The cases were reloaded some time in Dec. 1924, without cleaning, and had stood in an unheated room all winter and spring. On opening one of the cartridges, the powder was found to measure very close to 35.3 grains (my scales are only good to about ½ grain). Cartridges had been loaded with a Bond measure checked against the scales, so there is no chance of an overload.

I am taking the liberty of sending you some of these case both loaded and unloaded, by prepaid express. Could it be that the deterioration in these cases was due to standing all winter in a place where the temperature sometimes dropped as low as 0 degrees F.? I know that extreme cold will sometimes cause metals, such as tin, to crystallize and loose tensile strength. Of course it might be that the cases were made from poor brass to begin with, but I have always heard that F. A. cases were about the best available. Or could it be that reloading of the cases without cleaning has caused the primer residue to corrode the brass and weaken it? The unused cases show no undue weakness around the necks.

I have been reloading now for over a year in the .30-06, .30-40 and other cartridges, with good results. I am very cautious and try to go slow and take no chances. But I can see, in the light of such occurrences as this, why some of the arms companies try to discourage reloading. Such results might be expected with War-time cases, but hardly with good pre-war F. A. stuff.

Perhaps you can load up some of the unused cases to see if they give the same results in one of your Krags as they did in mine. I dislike to bother you with a thing like this, but letters to the arms and ammunition companies are likely to draw either a very non-committal answer or a general warning against the dangers of reloading. W. C. T.

Answer (by Major Whelen). The fired Krag cases were sent to Fort Benning and are there now. I left Fort Benning permanently. But it does not seem necessary to wait for the arrival of the cases because it is very clear that your trouble is a combination of season cracking and corrosion. Your loading seems to be absolutely all right, except in your neglect to clean the cases before loading.

Season Cracking: The splits and cracks, usually in the necks of cartridge cases, are due to what we term "season cracking." Season cracking may occur very soon after a case has been made due to poor brass, or to wrongly annealed brass. Or it may occur only after the case has remained a number of years, due to ageing. It is really due to a change in the grain structure of the brass and the inability of that grain structure to stand the strain at the neck and the strain of an oversized bullet inserted at the neck. As stated, the change comes gradually as a result of ageing, but may be hastened as a result of poor brass or improper anneal. With the very best cartridge cases it is liable to occur in five to ten years. Frankford Arsenal cases made in 1909, incidentally of very excellent brass, should now, after sixteen years, be showing a large percentage of cracks and splits. Most of these will not develop until the cases have been fired. This is the nature of brass. We have not yet found a way to overcome this. Of course War-time cases, as a rule, go bad quicker than those made in peace, for the brass is not quite so good, and the anneal could not be so accurately assured when manufactured in such large quantities and at such speed.

Corrosion: When a cartridge case has been fired, if it be not cleaned at once, corrosion starts in the interior from the primer and powder fouling. Verdegris forms, and begins to weaken the case, and also to deteriorate the powder. Primer and powder fouling will have little effect on dense, coated powders like our various high pressure powders, for some months. But with uncoated, bulk powders, like Du Pont Nos. 1, 2, 75, and 80 I have known the fouling to cause so much deterioration in ten days as to cause missfires and hang-fires. These were exceptional cases, however.

In your case you seem to have a combination of season cracking and corrosion. Your cases were evidently on the ragged edge from season cracking, and the very slight weakening due to the fouling caused them to go bad all at once. Yours is a very exceptional and unfortunate combination. In my work I have had almost no trouble from either of these sources. I try to obtain fairly new cases. I fire them and then chuck them in a cigar box which has on the outside of it the number of the rifle in which they were fired. If I want to do some work with that rifle I don't hesitate to take some of these fired cases out, decap and resize them, and load and fire them without washing. But ordinarily these cases remain in their box anywhere from a week to two months until I am using the cleaning solutions, when I wash them free from fouling, dry them, resize them at the muzzle, and put them back in their box ready for reloading at any time. I do not load dirty cartridge cases except only for work in which they will surely be fired within a week. I use the method of washing and cleaning cases with acid, and of drying them, as given in the chapter on reloading in my book "The American Rifle."

I hope this will help you out in the future. Go ahead and use up the cases you have in practise as long as they last. There is no danger But for important matches, for hunting, or where the cartridges are to remain loaded for some time, get fairly new cases, and when you reload them clean them inside first.

THE PATH OF THE BULLET

THE ex-soldiers and "Native" hunters of our little group here are having a hard time to get along because of an argument over the course that is taken by a bullet fired from a Springfield; please explain the bullet's course (the main interest is in what the bullet does just after leaving the gun). We would appreciate a diagram. H. E. M.

Answer (by Major Whelen). By asking me merely to explain the course taken by a bullet fired from the Springfield rifle, you have given me a pretty broad question to answer. Really I don't know just exactly what you want. Generally speaking, I ought to refer you to any standard book on ballistics. Or you will find a whole lot of information in my own book "The American Rifle." But as you are located in Alaska where books and libraries are few and far between, I am going to take a stab at answering your question as fully as it can be done in a letter.

When a bullet issues from the muzzle of a rifle it is acted upon by three forces.

(a) The propelling force of the powder gases, which in the case of the Springfield and standard cartridge, give it a velocity of about 2700 feet per second at the muzzle.

(b) The force of gravity which causes the bullet to drop to the earth. The bullet starts this drop at gradually increasing speed as soon as it leaves the muzzle. All bullets drop about 16 feet the first second, 32 feet the second second, and 32 feet the third second if it travels that long. If the barrel be given considerable elevation (sighted and shot to a long distance) the bullet travels high up in the air, and has a chance to drop a long distance before it strikes the earth.

(c) The resistance of the air, which causes the bullet to constantly decrease in velocity. For example the remaining velocities of the Springfield rifle using 150-grain service cartridges are approximately as follows:

	f.s.
Muzzle	2700
100 yards	2481
200 yards	2267
300 yards	2059
500 yards	1664
1000 yards	989

A combination of all these three forces results in the trajectory or curved flight of the bullet. Thus in firing at a target 500 yards away the bullet rises to a height of 24 inches above the line of aim at a range 270 yards from the muzzle of the Springfield rifle.

More practical, and more to the point from your standpoint: Suppose you sight in your Springfield to strike the point of aim at 200 yards. The bullet starts out from the muzzle about an inch below the line of aim (because the axis of the bore is baout an inch below the top of the front sight), it crosses the line of aim *about* 10 or 15 yards from the muzzle, and rises above the line of aim *about* 1¼ inches at 50 yards, 2¾ inches at 100 yards, and *about* 3 inches at 110 yards. Then the bullet begins to fall, and is about 1½ inches above the line of aim at 150 yards, and of course at 200 yards it strikes close to the point of aim. I say *about* in the above figures because no rifle and its ammunition are absolutely accurate. A good Springfield with good ammunition in the hands of a fine shot should keep all or nearly all of its shots in a 1½ inch circle at 50 yards, 3 inch circle at 100 yards, and 6 inch circle at 200 yards. Often it will do quite a little better than this. Therefore a single shot *might* seemingly strike as much as 4¼ inches high at 100 yards, but the average of ten shots would be just about 2¾ inches high as above. This trajectory as described is of real value to a hunter.

Drift and jum palso effect the flight of the bullet. When the Springfield is fired the barrel jumps or vibrates very slightly to the left, so the bullet starts out on a course slightly to the left of the axis of the bore. At the same time the bullet drifts to the right as it is fired. Thus the lateral deviation of the bullet is always the algebraic sum of the jump and the drift and this deviation in the case of the Springfield is about as follows:

	Total Deviation in inches	
Range	Left	Right
100 yards	.26	
200 yards	.42	
300 yards	.45	
400 yards	.32	
500 yards	.00	.00
600 yards		.55
700 yards		2.0
800 yards		4.5
900 yards		8.2
1000 yards		13.0

However, as this deviation is either compensated for by the design of the rear sight, or practically eliminated by sighting in the rifle, it never becomes apparent to the rifleman.

The bullet issues from the muzzle preceded by a small quantity of powder gas (which escaped past the bullet as the bullet traveled out of the cartridge case into the bore, before it completely sealed the bore), and followed by the remainder of the powder gas. Thereafter the bullet is acted on as heretofore described. It is doubtful if the powder gas gives any additional velocity to the bullet after it leaves the muzzle.

The Arms Chest

TERMS

THE uniformly excellent returns from advertisements appearing in the classified columns of THE AMERICAN RIFLEMAN make it a most satisfactory and productive medium for the disposal of surplus shooting equipment, or the acquisition of special types of firearms.

Free Insertions. Each subscriber is entitled to one insertion of one-half inch, when his subscription is paid for one year. It is necessary only to write or print the text plainly, noting thereon the date subscription was paid. These advertisements will appear in the first available issue and should be in publication office two weeks prior to the following publication date.

Paid Insertions. Non-subscribers or those who have already made use of the subscriber's privilege may take advantage of these columns at a cost of $1.00 per inch or part thereof. No advertisement for less than $1.00 accepted. Advertisements will be set in 6-point solid. They should be in the publication office two weeks prior to the time appearance is desired.

FOR SALE—Checkering tools, $5.00 a set. Three double row spacers, fine, medium, coarse. One double end cutter, bent Swiss file for finishing, flexible straight edge, instructions as to use of tools. Guaranteed. Purchase price will be refunded on any set if not satisfactory and returned to me. R. J. Snyder, Box 23, Pine Castle, Florida (formerly of Union, N. Y.)

GUN BLUING—Simple 15-minute process, not a paint, used for years, unexcelled, enough for 15 guns, $1.25. Pacific Arms Corporation, Box 427, San Francisco, Calif.

CARTRIDGES—.45 Colt, not auto, $2.50 per 100. $22.00 per 1,000 (absolutely perfect). 7 mm. Mauser rifle f.m.p. cartridges, discolored by water, $4.50 per 100; $40.00 per 1000. Pacific Arms Corporation, Box 427, San Francisco, Calif.

SHIFT WITH THE HOUSE OF SHIFF THE GUNMAN, N. Woodstock, N. Hampshire. The last price list for 1925 will be out in a few weeks. Our stock is very complete and summer prices hold until October 1. We are stealing second base from the fanatics. If you can read and FIGHT you will get your money's worth if you care to ship your stamp.

WANTED—8 or 10-power Fecker scope and mounts, new condition. Give particulars first letter. McCormick, Box 883, Lake Worth, Florida. 2-15-26-F

FOR SALE—Win. .30-30, 26 in. oct. barrel, Sheard gold front, Marble peep rear, open on barrel, extra slot for scope, with No. 6 Adjustable Ideal tool complete mold in tool, $25.00. Stevens 44½ Ideal, 34 in. barrel, 11 pounds, bored to .32-40 last summer by Peterson of Denver, Marble rear, folding leaf and Lyman hooded bead and aperture front. Inside perfect, outside not so good, but nothing out of order. With 90 loaded cartridges, $25.00. Ballard, .40-85, double set-triggers, 32 in. heavy oct. barrel; bore very slightly pitted, fore-end splintered; $20.00. Win. .25-20 S. S., 28 in. oct. barrel, inside considerably pitted. Lyman comb. front, Marble peep, gun still remarkably accurate; price with Ideal No. 3 tool, 77 gr. mold, about 300 empties and about 200 bullets, $15.00. Stevens Favorite .22 l. r. pitted, good cat gun, $3.00. Savage .25-20 Sporter, new, perfect, $20.00. Ithaca 20, 28 in., full, Field grade; inside perfect, bluing slightly worn; $25.00. WANT—Springfield .30-06, either Nat. Match or Service rifle with Match barrel; must be perfect inside and prefer with both service and Lyman 48 sights. Sumner H. Scott, Yakima, Washington. 851

FOR SALE—Bought stock of new Winchester and Newton rifles from jobber who was closing them out at price, whereby I can recall them at less than wholesale. Rifles are all new and perfect. Never fired. .25-35 Model 1894 rifles, $27.50. .25-35 Model 1894 rifles, take down, $33.50. .38-55 Model 1894 rifles, $27.50. .30-40 Model 1895 rifles, $32.50. One receiver, otherwise perfect, never fired, $27.50. Two only .30 Newtons with extra peep sights on bolt, $40.00. One only .30 Newton, regular sights, $35.00. These are the original Newtons, have been in the jobber's stock for years. They are new and perfect. One used .32 cal. Model 25 Remington barrel, perfect, rest of gun very good. Shot less than 100 times; $26.50. One used .22 cal. Stevens Off-Hand target pistol, 6 in. barrel, perfect, $9.00. One new Duxbak Duck Hunter's Coat, size 42, $11.50. New 12-16 and 20 ga. Fulton shotguns, $28.50. New 16 and 20 ga. Fox Sterlingworth shotguns, $38.50. One used 12 ga., full choke, Iver Johnson ejector, single, like new, $8.00. WANT—Carl Zeiss 12-40 or 16-40 Binocular, also case .30-40 cartridges. Chas. Hoffmeister, Imperial, Nebraska. 862

FOR SALE—1 32-40 Zischang barrel, bore perfect, 1 Ideal Lubricator and Sizer Dies for .32-40. 1 Straight Line Re- and De-Capper. 1 .41 cal. Colts Frontier Model S. A. Lawrence H. Lapinske. 2-15-26

FOR SALE—Springfield free rifle, 24 in. heavy barrel, and Model 1922, pistol grip stock with Silvers recoil pad; rifle has a hand-made double set trigger by Niedner and I include with rifle a set of Winchester-Niedner tapered dovetail scope. Mounts to fit the Niedner taper dovetail, scope blocks with which the barrel is fitted; also equipped with Lyman 48 and 17 sights. All work on this rifle was done by Springfield Armory and A. O. Niedner. Has been fired 40 rounds and is new and perfect in every detail. Cost $142.00. Will sell for $80.00. C. A. Mentzer, 3808 Trowbridge St., El Paso, Texas. 860

FOR SALE—Parker 12 ga. hammerless, 30 in. full choke Damascus 2¾ in. chamber, splendid with Field Super X. New condition. WANT—Marble Game Getter, without or ruined barrels, cheap. Books on gunsmithing, "Twenty Years Snipe Shooting," by Pringle. Geo. E. Schmeling, So. Germantown, Wisconsin. 861

BACK NUMBERS OF "AM. RIFLEMAN WANTED—Will pay $1.50 each for one copy each of the following numbers in good condition: Sept. 15, 1923; May 15, 1924; Oct. 15, 1924. Write before sending. E. A. Van Vleck, 393 Seventh Ave., New York City. 2-15-26-F

FOR SALE—Ideal, Armory loading press, all attachments, 30-06, new, $35.00. Extra fine engraved Ballard action, Circassian shotgun, butt P. G., single adjustable trigger, built for N. R. A. shooting, $35.00. Peterson, 30 in. No. 3 barrel to fit above Ballard, 22, 15, 60, perfect, with fine fore-end, 200 new primed shells, Peterson mold, $20.00. Niedner Winchester s. s. .22 Winchester, C. F. nickel steel, 26 in. special stock, peep and gold bead, 200 shells, sizing and loading die. This is a high velocity, tight-chamber, vermin rifle, perfect inside, $45.00. Krieghoff Mauser, .375, 9.5 Manlicher, 26 in., unfired, $65.00. Kentucky cap-and-ball, beef match winner, lock rebuilt and perfect in and out, 51 in., .425 in. bore, full maple stock, mold, a 20-pound relic that shoots, $25.00, and is silver trimmed. Pope .22 short, heavy barrel 30 in., Remington Hepburn thread and like new; $10.00; fine barrel at junk price. Rustless Mauser, barrel threaded, blued, smooth, unrifled, $5.00. Remington 20 ga. pump, 26 modified, like new, $35.00. Ballard .32-40, light barrel, fine hand-made stock, set triggers, mold, $35.00. I want heavy Pope or Schoyen, center-fire Scheutzen, perfect. I will pay cash for any model gun, new, from factory. 5 Pope, palm rests, Scheutzen adjustable, $5.00 each. Hervey Lovell, 2809 Bellefontaine St., Indianapolis, Ind. 2-15-26-F

FOR SALE—L. C. Smith, Single Trap, 32 in., Specialty Grade, 14½x2x1½—8¼; perfect balance, new condition excepting slight wear of finish around guard; $100.00 C. O. D. E. S. Hull, Arkport, N. Y. 2-15-26-F

FOR SALE—Colt .45 S. A., 5½ inch barrel, slightly holster-worn, otherwise perfect, $25.00. Clarence J. Smith, 1120 20th St., Des Moines, Iowa. 2-15-26-F

FOR SALE—1 .45-70 Springfield rifle in almost new condition, with bayonet, $1.85. 1 256 Newton reloading tool, $4.00 postpaid. 1 Krag carbine in new condition with 120 rounds of ammunition, $15.25. 1 Krag receiver M 1898, $1.50 postpaid. Lyman 48 K, 48 B, 48 C, N. R. A., with disc tap and drill, $9.50 postpaid. Arthur E. Anderson, Fullerton, N. Dak. 2-15-26-C

FOR SALE—One 1892 Winchester .25-20, 24 in. round barrel, in fair condition, $13.50, and one 12 ga. double Belgium Interchangeable, Damascus steel, full and modified, perfect inside and out, cost $48.00, sell for $22.50; specially restocked. First money orders take bargains. Harold Kicker, Alice, Mont. 2-15-26-F

FOR SALE—Hensolt 12x24, Wetzlar, Prism Binoculars, fine used condition, $50.00. Colt .45, single action, $20.00. Colt double action Frontier, cal. .44, $20.00. Both 7½ in. barrels. Colt .22 Auto, $20.00. All perfect inside, slight holster-worn outside. S. & W. .38, special, 6 in. barrel, square butt, pearl stocks, perfect inside, bluing slightly worn outside, $25.00. Luger Pistol, 9 mm., made 1917, 8 in. barrel, perfect inside, practically new outside, $20.00. Winchester .22 M 1890, newly relined by Diller, outside bluing worn, inside perfect, gold-bead front, Marble peep rear sight, $18.00. Money order or certified check only. WANT—.22 Springfield, S. & W. .22, perfected Target Pistol, 10 in. barrel, high grade 12 ga. shotgun, 30 or 32 in. barrels, full choke, bored for 3 in. shell. Above guns must be perfect. Winchester 5A scope with mounts. Lt. F. M. Alexander, Fort Missoula, Montana. 2-15-26-C

WANTED—Confederate-made firearms; brass frame Colt revolvers, "Tallahassee, Fla.," carbines, and a "Tarpley" breech-loading carbine; also, a Springfield rifle, 1903-06, as issued, less bayonet. Address E. Berkley Bowie, 811 N. Eutaw St., Baltimore, Md. 2-15-26

FOR SALE—Model 1917 Field Telephones, brand new, $20.00 pair. U. S. Army marching compass, new, $1.25 postpaid. W. F. Sattler, 514 Park Ave., Collingswood, N. J. 2-15-26-C

ATTENTION, Rifle Clubs and Club members. 1917 Model field telephones, brand new, $20.00 pair. Cartridge and pistol belts, rifle slings, shooting bags, clip and magazine pockets, etc., new. Send name and address of your Rifle Club for free list. Wm. F. Sattler, 514 Park Ave., Collingswood, N. J. 2-15-26-C

FOR SALE—Model 1917 Field Telephones, brand new, $20.00. Cartridge belts, 10 pockets or 9 pockets with space and snap for Auto Pistol magazine pocket or 1917 Rev. Clip pocket, 75c each. Clip or magazine pockets, 75c each. Pistol belts, 50c. Rifle Slings, 50c. All new. Postage extra. Wm. F. Sattler, 514 Park Ave., Collingswood, N. J. 2-15-26-C

WANTED—Cylindrical adjustable mold, .40 calibre; .40-85 Ballard everlasting shells, must be new; .38 cylindrical mold; serviceable barrel for Remington-Hepburn action. C. L. Curtis, 585 E. Taylor, Portland, Ore. 2-15-26-F

FOR SALE ONLY—38 S. & W. spl. target, 6 in., $25.00; .44 S. & W. spl., 5 in., $25.00; .38 Colt Police Positive, 4 in., $17.00; Bond tool, .38 spl., $7.50; .38 spl. double cavity mold, $3.50; Win. tools, 2 molds, $38.40, $3.50; .40-82, $3.00; .32 S. & W. long or Colt N. P. tool, 2 molds, $3.50. Bond tools and molds for .38 spl. and .44 spl. complete; reasonable. All revolvers and tools in new or as good as new condition. Ezra Carpenter, Owls Head, N. Y. 2-15-26-F

GUNSMITHING, restocking, skilled repairing of high-grade foreign and domestic guns. Modern and antique fire-arms bought, sold and exchanged. James Macdonald, 21 Cornhill, Boston, Mass. 2-15-26-F

WILL EXCHANGE 23-jewel Elgin R. R. watch in nickel screw case, almost new, and will give cash difference for a high-grade Fox 12 ga. double gun. W. S. Brown, Flagstaff, Ariz. 2-15-26-C

TRADE—3A Kodak and outfit, new condition, cost $48.50, for Winchester .52, B. S. A. or Fecker Scope. H. F. Hoecker, 50 E. 24th St. North, Portland, Oregon. 2-15-26

FOR SALE—Model 1917 S. & W. Revolver, .45 A. C. P., good re-finished condition, $13.50. H. B. McCollum, 506 W. 19th St., Wilmington, Delaware. 2-15-26

FOR SALE—N. R. A. Rem. Repeat. .22 rifle, Lyman sights, windage front sling, fine, $22.00. H. & R. 12 in., 28 ga., single pistol, new, $10.00. Krag rifle, star gauge, excellent, $10.00. Box of 20 Peter's Match .30-30 Govt. am. from Camp Perry, '21, 3c a piece. First P. O. Money Order. 2-15-26-C

SELL OR TRADE—B. & L. 6x30 prism binoculars without case, $18.00, prepaid. WANT—Ross Mark 3 or Short Lee Enfield. R. Le Myre, 370 Coplin, Detroit. 2-15-26-F

WANTED—One .45-120-550 or .40-90 Sharps, in first-class condition; also 200 empty cartridge cases or more and reloading tools. W. H. Wade, 176 Eaton St., Buffalo, N. Y. 2-15-26-F

FOR SALE—.22 De Luxe hammerless rifle, new, $50. Maynard heavy-barrel target rifle, .40 cal., $10. .45-70 Sharps-Borchard, good, $12. .45 Remington action, single-shot smoothbore, fine, $5. .45-120-550 and 12 ga. combination shotgun-rifle, good, $15. 8 mm. German military rifle, Spandau, 1902, nice, $17.50. .41 Vetterli repeater, fine, $4. .35 cal. Deringer percussion rifle, nice, $7.50. .45 J. Henry percussion smoothbore, good, $5. .45-70 Winchester-Hotchkiss carbine, good, $7.50. 7 mm. Spanish Mauser carbine, by Loewe, Berlin, 1896, 18-inch barrel, nice, $12.50. C. H. Goddard, 4 East 28th St., N. Y. City. 2-15-26-B

FOR SALE—1 .32-20 Win. Mod. .53 gold-bead front and receiver peep sights. Inside perfect, outside shows a small amount of wear; $25.00. 1 .33 cal. Mol. 1886 Win., half magazine with sling swivels; same condition as above; $25.00. 1 .32-20 Colt's Army Spcl., 6 in. inside, perfect outside, shows a small amount of wear; Heiser belt and holster; $28.00. 1 .44-40, 7½ in. Colt's New Service, new, with 2½ lb. trigger and gold front sight; $28.00. J. B. Stocking, 758 Eddy, Missoula, Mont. 2-15-26-C

WANTED—Best .44 S. & W. Special; $15.00 will buy. Mechanism must be A-1, but inside of barrel need not be perfect. A. R. Welker, 406 N. Harvey Ave., Oak Park, Illinois. 2-15-26-F

WANTED—Case of Krag ammunition; state price. For Sale—90 rounds .33 cal. W. C. F. Winchester cartridges; $3.50. J. A. Justeson, Gridley, Calif. 2-15-26-F

FOR SALE—First $40.00 money order takes Savage Model 99-G, 250-3,000. Marbles' S. I. peep, 95 H folding leaf and ivory bead front sights. Perfect inside and out. S. I. Ruch, 615 E. Spruce St., Springfield, Illinois. 2-15-26-F

WANTED—Colt, Starr, Remington, Rodgers & Spencer and other makes of .44 cal. percussion revolvers; also Remington .50 cal. Navy and all models of Colt .44 and .45 cal. revolvers. Good to fine condition. The Spencers, Lebanon, Ohio. 2-15-26-F

FOR SALE ONLY—"Allen Sporting Rifle," $20.00. Hall's breech-loading percussion carbine, $6. Chinese matchlock, silver inlaid, $10.00. Hall's breech-loading flint musket, $10.00. English double percussion shotgun, engraved, $6.00. Joslyn carbine, $5.00. German needle-fire rifle, $6.00. Robbins & Lawrence peep-sighted percussion musket, $6.00. Union (Grapevine) percussion carbine, $5.00. Maynard percussion carbine, new, $6.00. Sharps percussion (Pill Primer) rifle, $6.00. Remington cartridge (.50 pistol), rifle, rare this caliber, $6.00. U. S. Harpers Ferry musket, percussion, $6.00. U. S. Govt. percussion musket, altered from flint, $4.00. Meriden Arms Co. "Kentucky Repeating Rifle," $5.00. Double percussion shotgun, $3.00. Full-stocked octagon barrel percussion rifle, $5.00. THE LOT, $100. All crank collector condition. Stamped addressed envelope for descriptions. Fred R. Knodle, 429 Burton Ave., Washington, Pennsylvania. 2-15-26-B

FOR SALE—1 .38 S. & W. Special, 6 in., like new inside and out. Heiser holster and belt for same. Outfit, $28.00. 1 Colt .45, 1917 model, 5½, new, shot a few times, $15.50. Buescher E flat alto saxophone, silver finish, snap pads, good condition, with case; cost $148.00; takes $85.00, all cash. No C. O. D. W. T. Watson, Oxford, Iowa. 2-15-26-B

I RECHAMBER your Krag, or your .25-36 Marlin, to use modern ammunition, and use it accurately; $5.00. L. N. Niccolls, 803 East Court St., Pendleton, Oregon. 2-15-26-F

TRADE—Krag in perfect condition, inside and out, 25 in. barrel, 100 rounds ammunition, Springfield sight, strap, for .45 cal. Colt's new Service, 7 in. barrel or .45 automatic Govt. model. Beeman North, Jr., 522 Third Ave., Ottawa, Ill. 2-15-26-F

FOR SALE—One .25-20 Winchester model, 1892, take-down, Lyman sights, and reloading tool's; shoots well; $18.00. One .32 double-action Iver Johnson revolver, $5.00. Guy A. Countryman, Sandusky St., Ashland, Ohio. 2-15-26-F

WANTED—.30-30 or .303 Savage rifles; must be good condition. Give particulars and lowest price first letter. Ralph Napier, Wixom, Mich. 2-15-26-F

FOR SALE OR EXCHANGE—9 mm. Luger, 1912, 4 in. barrel, perfect except slightly pitted; wonderful'y accurate; sell $19.50. .41 cal. Remington double derringer, with three-quarter box cartridges; cost $12.50; sell $6.75. 2 extra magazines for .22 Colt Auto., new, cost $4.50, sell $3.00. 455 Webly English Bull Dog revolver, full box cartridges, cost $12.50, sell $2.50. 200 S. & W. cartridges, 44 regular.; 95 S. & W. gallery load, .44 cal.; 130 S. & W. Special, .44 cal., some metal cased. Entire lot cost $25.45; sell lot for $15.00. New Magneto Flashlight (batteryless), cost $6.00, sell $2.75. L. W. Warnken, Adrian, Missouri. 2-15-26-C

WANTED—.38 Colt Auto, pocket model. Hardy spring clip shoulder holster for same. Stevens 410 ga. pistol, 12 in. barrel, with holster. Stevens Diamond model pistol, .22 L. R., 6 in. to 10 in. barrel, .22 cal., .38 cal. Military, .45 cal. Colts autos., .22 cal. Reisings 6 in. or 10 in. barrels. All above guns must be perfect inside and accurate, reasonably priced. Exchange only. Give full particulars first letter. Enclose stamps. L. W. Warnken, Adrian, Missouri. 2-15-26-C

WANTED—Best .44-40 Remington rifle, $15.00 will buy. No matter what barrel condition may be, just so the rest of gun is O. K. A. R. Welker, 406 N. Harvey Ave., Oak Park, Illinois. 2-15-26-C

POWDER MEASURE—Want Ideal No. 6 or No. 5. Will consider Modern-Bond if price is right. Must be complete, in perfect condition and moderate price. Can use reloading tool for Colt .32 New Police. A. L. Wyman, 1517 14th St., Santa Monica, Calif. 2-15-26

FOR SALE—Stevens No. 40 Pocket Rifle, skeleton stock, .22 long rifle, with 12 in. barrel; Stevens 550 telescope attached; $22.00. C. D. Ramsdell (Bangor, Maine), .50 calibre muzzle-loading rest rifle, 23 lbs., 34 in. octagon barrel, false muzzle, set trigger, mould, patches, flask, $35.00. Flint lock horse pistol, R. Johnson, 1841, good condition, $20.00. Mannlicher Schoneaur, 22 in. 8 mm. double set, new condition, $38.00. Winchester, 1886, extra light, take-down, .45-70, half magazine, Lyman rear, leaf on barrel, ivory bead front, $28.00. Winchester, 1895, take-down, .30-06 cartridge, Lyman receiver sight, fine condition, $38.00. Kirkwood Bros., Inc., 23 Elm St., Boston, Mass. Established 1874. 2-15-26-B

FOR SALE—Pope .33 cal. Schuetzen on Win., single shot, heavy action, spurred finger lever, palm rest, octagon No. 3 barrel, fancy walnut stock, cheek rest, Swiss butt plate, brand new, $75.00, cost $125. Shells, bullet mould and loading die thrown in. All Pope products. Leonard J. Miller, 3342 N. Carlisle St., Philadelphia, Pa. 2-15-26-C

EXCHANGE—Colt .45 s. a., 4 inch, good condition. Remington .50 pistol, almost factory con., with 8 in. perfect barrel. WANT—S. & W. '17, and Bisley Colt in good condition. Ideal mold No. 454190. 949 6th Ave., San Bruno, California

FOR SALE—Krag Sporter, remodeled, oil finished stock, 24 inch barrel, new Kerr sling and new No. 48 Lyman receiver sight. Guaranteed perfect inside, fine outside; price, $18.00. R. McCaslin, Centralia, Kansas. 2-15-26

SALE OR TRADE—Made-to-order Savage Trap Grade Pump, brand new in factory box, with two stocks, full ribb, 12 ga., 30 in., cost $95.00; take $75.00. New .250 Savage, aluminum butt, Lyman receiver, Marbles leaf & Gold front sights, special sling, $45.00. Brand new pre-war Schilling Mauser, .30, '06, full ribb, set triggers, etc, $95.00. New Kerner, .30, '06 Mauser, $30.00. .303 Savage, like new, $27.00. Colts N. S. .38-40, never fired, with Audley holster, $30.00. Brand new .256 Newton, $45.00. 12 ga. Remington Auto, with case, new, $55.00. Three Bisley Colts. Henry F. Zinner, Middleburgh, N. Y. 2-15-26-F

FOR SALE—Several hundred old gun catalogs. C. H. Goddard, 4 East 28th St., N. Y. City. 2-15-26-B

FOR SALE—Model 1892 Win., .25-20, new barrel, balance of gun fine; round barrel, 24 in., $20.00. Krag carbine, good, $15.00. 1,000 rounds .32-40 Winchester, $20.00 for quick sale or $2.25 per hundred. Marlin, 1892, cal. .22, octagon barrel, perfect condition, $15.00. Arthur Strode, 2311 Grant St., Vancouver, Wash. 2-15-26-F

FOR SALE—1 .38-55 Winchester, S. S. Lyman peep and bead sights. Set trigger. 100 primed shells, loading tool, fine inside and out. Money order, $22.50. August Ginter, Peotone, Ill., P. O. Box 302. 2-15-26-C

FOR SALE—About 4,000 Winchester .30 cal. Springfield Service ammunition, 150 grs. bullet, $25.00 a 1,000, or $3.00 a 100 rounds. P. J. O'Hare, 552 Irvington Ave., P. O. So. Orange, N. J.

FOR SALE—.30-06 N. M. Springfield sporter, Lyman 103 peep on firing pin, ivory front. A No. 1 condition, cost $80.00, take $55.00. Stevens .22 L. R. single shot, heavy barrel, pistol grip, Swiss butt, Stevens scope, auxiliary heavy nickel steel, .25.25 barrel, center-fire block, high speel shell, and tools for reloading. Outfit, $35.00. W. G. Elliott, West Springfield, Pa. 2-15-26-C

FOR SALE—Unless otherwise noted, everything factory new. Savage .22 Sporter, latest improved action, $18.00. .32 S. & W. Reg. Police, $20.00. French Apache Palm Pistol in case, unique and rare, $9.00. .38-55 Winchester, perfect in, fine out, $15.00. .32 Colt P. P., perfect in, fine out, $18.00. Pair pearl grips for .45 Auto Colt, $7.00. Set boxing gloves, pair boxing shoes, 8½, punching bag, $15.00. Colt .45 Frontier, 7½, perfect in, fine out, $25.00; another, $21.00; another, 4¾ barrel, $25.00. Colt .22 Auto target, $30.00. Colt .22 P. P. Target, $25.00. 32-shot magazine for Luber, $7.00. H. & R. .32 Hammerless, $10.00. U. S. Ashton Perc. pistol, fine, $8.00. Colt .41 D. A., good condition, $6.00. Genuine Mannlicher, 6.5 mm. (.256) carbine, a beauty, $50.00. Vest Pocket Kodak in case, $2.00. War Medals, 12 different, $3.00. Stevens 6 scope, mounts, blocks, $11.00. Act quick. Anything over $10.00, C. O. D. upon deposit. Will swap Sawyers firearms in American History for Whelens American Rifle. F. J. Valente, Box 135, Mansfield, Massachusetts. 2-15-26-C

FOR SALE—Winchester Model '95 Carbine, 30-06, Shotgun buttstock, fitted with Lyman No. 38 Windgauge receiver and ivory bead front sights and sling strap. New, never fired, factory condition, $36. Ewing Carter, 1503 Minn. Ave., Bessemer, Ala. 2-1-26

FOR SALE—Winchester 12-ga. Model 1897, $16.50; .45 Colt Auto, Gov. Model $17.50; .45 Colt Auto, Commercial, inside perfect $22.50; 50-cal. Ball's carbine, 7 shots $7.50; .38 Smith & Wessou S.A. like new $11.00; 1 case Krag cartridges $36.00. D. O. Amstutz, Ransom, Kans. 2-1-26-C

FOR SALE—Colt 5-shot, 36-cal. 4½-in. barrel, cap and ball pocket revolver. Square walnut butt, length over all 9¾ inches, wt. 1 lb. 8 oz. Serial No. 16470. Blued finish, nickeled brass trigger guard. Barrel stamped "Address Col. Sam'l Colt New York, U. S. America." Cyl. stamped, "Pat. Sept. 16th, 1855." Perfect mechanically. In original black walnut velvet lined partitioned case with small copper powder flash, nipple wrench, bullet mould for round and conical bullets, old Japanned cap boxes, lock and key, bullets. Write for further information. Not sent for examination. W. L. Shaw, 16 Salmon St., Manchester, N. H. 2-1-26-B

SELL OR TRADE—Stevens New Model 22 Pocket rifle, 15 inch barrel, pitted $11., 500 Stephen Grant double hammer rifle $45., 22 Ballard Single Trigger, needs repair $7., another 32 cal. $7., 38 E. X. L. Remington Rolling Block Central fire, action like new $12., 303 Savage, pre-war, 26-inch half octagon barrel $23., 30-06-1917 Army, not reclaimed junk, $18., 32 Winchester Rim Fire Single Shot $8., 303 Enfield 1914 $15. 177 Tell $15 Air Rifle $10., 303 Long Lee Enfield, B. S. A. Match barrel of Motty Special Steel, Bayonet, Sling, Sight cover, open and Receiver Peep Sights $23., 40-82 Winchester 1886, stock damaged, barrel pitted, but serviceable $8., 44-40 Model Hopkins & Allen Single shot, marked Merwin & Hurlburt, pistol grip stock and forearm checkered $10., 7 mm. Mauser made by Loewe of Berlin in 1894, 29-inch barrel, bead front, inside perfect $19., 38-55 Winchester Single shot, case-hardened receiver, No. 3 30-inch octagon barrel, Fancy pistol grip stock and forearm checkered, single trigger, Globe front, vernier rear, $29., 30-06 Springfield bayonet and scabbard $6.50., 45 Colt automatic Holster $1.50., Leather Sling for Springfield $1.25., 45-1917 army revolver holster $1.50., S. R. Bridge, 214 West 34 St., New York, N. Y. 2-1-26-C

FOR SALE—Stevens 414 .22 long rifle, fitted with scope blocks, perfect condition, very accurate; price, $14.00. George Grieshamer, Baltic, Conn., Box 258. 2-15-26-C

"They group closer in any barrel."

THIS statement expresses the opinion which shooters everywhere have of US .22 N. R. A. long-rifle cartridges. It was taken from the following letter received from Chief Range Master A. L. Smith of the Ossining Rifle Club, Ossining, N. Y.

"We use US .22 N. R. A. cartridges in all of our shooting. I find by our machine-rest testing that they group closer than any other make in any barrel."

Slip a US .22 N. R. A. in that rifle of yours. Hold on the "bull." Squeeze the trigger. See the result.

—Or, better still, test 'em in a machine-rest.

Three ten-shot groups made at 25 yards with US .22 N. R. A.'s, in a machine-rest test, by A. L. Smith, Chief Range Officer of the Ossining Rifle Club, Ossining, N. Y.

UNITED STATES CARTRIDGE CO.

111 Broadway New York, N. Y.

"Do not surrender" —"Never"

ELEVEN O'CLOCK—the morning of October 19, 1917. A merchantman and a German U-boat, snapping at each other at 2000 yards.

Her engines disabled, her after gun silenced, fire raging in her forehold, and a large hole in her port side forward, the J. L. Luckenbach, with her little Navy gun crew, was still giving back shell for shell after four hours' fighting.

Over the rim of the sea came a gray shape, whispering along in a white cloud of spray—the U. S. Destroyer Nicholson.

"Do not surrender," she radioed the Luckenbach.

"Never," came back the answer.

A few moments later the U-boat, sighting the Nicholson, fired a final defiant shell and disappeared.

Those few radioed words will live—for they express the gallantry of the many plucky gun crews that defended our merchant ships against overwhelming odds.

E. I. DU PONT DE NEMOURS & CO., Inc.
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